



# OBSTETRICAL AND GYNECOLOGICAL SURVEY

Volume 2

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### Obituary: Dr. R. Marshall Allan

Word has been recently received of the death of Dr. R. Marshall Allan, of Melbourne, Australia, following an illness of many months. Dr. Allan had for many years been Professor of Obstetrics and Gynecology in the University of Melbourne, and he had been a member of the Associate Editorial Board of the Survey from the very inception of the latter. By virtue of his professorial position, and his long years of practice and investigation, he was the recognized leader of his specialty in Australia. He was an Honorary Fellow of the American College of Surgeons, before which he delivered an address about twelve years ago. He also took an active interest in the organization and work of the Royal College of Obstetricians and Gynecologists. His death will be mourned by his many friends in all parts of the world.



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# *Obstetrics*

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## PHYSIOLOGY OF PREGNANCY, LABOR AND PUERPERIUM

### INTRAUTERINE RESPIRATION OF THE HUMAN FETUS

M. E. DAVIS AND EDITH L. POTTER

J. A. M. A., 131: 1194-1201, 1946

A great deal of experimental work has been done on the intrauterine respiration of the fetus, but as yet the relationship of intrauterine respiratory activity to extrauterine respiratory activity is not understood. Oxygenation of the fetal blood is carried on by the placental circulation, so that theoretically intrauterine respiration could serve no useful purpose. However, respiratory movements of the fetus within the uterus have been observed and described many times. Some investigators believe that these movements represent true respiratory efforts, and that during such respirations amniotic fluid passes into the bronchi and alveolar spaces. Thus, during the intrauterine life of the fetus, pulmonary activity makes use of fluid rather than air. Snyder and Rosenfeld, in experiments on rabbits, provided evidence for this belief. Windle and his associates, on the other hand, do not support this conclusion. In their opinion, true respiratory movements are always the result of an interference with the normal oxygen supply through the placental circulation. Windle reported having examined x-rays of 6 infants who had been born after the injection of thorotrast into the amniotic fluid. There was no evidence of thorotrast in the lungs; however, no data are given as to the amount of thorotrast injected or time interval between injection and delivery.

The authors undertook the present studies in order to obtain further evidence as to whether amniotic fluid normally moves in and out of the alveoli of the human fetus. These experiments were performed on 2 groups of patients. The first consisted of 16 women in the first half of gestation in whom therapeutic abortion was decided upon for serious maternal complications; since no further pregnancies were desirable, laparotomy was performed and the fetus removed by hysterotomy. The second group consisted of 10 women at or near term on whom cesarean section was performed.

In the first group of 16 patients between 12 and 40 cc. of amniotic fluid was withdrawn and replaced with thorotrast (thorium hydroxide). In 12 of these 16 patients the pregnancy was terminated 17 to 52 hours later. In 4 patients the fetus was delivered within 30 to 60 minutes following the injection. The first 12 fetuses weighed from 39 to 440 Gm., and x-ray examination showed

thorotrast to be present in the lungs and in the stomach and intestine in all instances. In the fetus in which the interval was shortest (17 hours), the shadow both in the lungs and gastrointestinal tract was considerably less dense than in those in whom the material had been present for a longer time. The last 4 fetuses in this group weighed from 9 to 110 Gm. Only 30 to 60 minutes were allowed to elapse between thorotrast injection and delivery in order to determine whether factors intrinsic in the operation might be responsible for the presence of thorotrast in the lungs. No thorotrast was demonstrable in the lungs of any of these 4 fetuses, except in the main bronchi of one (110 Gm.). Microscopic examination failed to reveal the presence of thorotrast in the lungs of any of the 4 fetuses; it is concluded that the presence of thorotrast is not related to the operative procedure.

Microscopic examination revealed the presence of thorium histologically in the bronchi, in the alveolar ducts and in the alveolar spaces where these had become differentiated. Also, a gradual progression in development of the fetal lung was observed in direct relation to increasing fetal weight. Thorium was found in equal amounts in all parts of the lungs of the 12 fetuses. This would indicate that the amniotic fluid containing the thorotrast circulated freely throughout the entire pulmonary tree.

In the second series of 10 women delivered by cesarean section at or near term, from 24 to 48 cc. of amniotic fluid was withdrawn and replaced with thorotrast. The infants were delivered 16 to 48 hours later. X-ray examinations of the infants' lungs immediately after delivery showed evidence of thorotrast in the alveolar spaces in 5, its probable presence in 2 and no definite evidence in 3. The authors consider it probable that some thorium was present in the lungs of all these infants, but that there may have been excessive dilution of the material by amniotic fluid, so that a visible shadow was not produced.

It would thus appear that amniotic fluid and its contents are normally aspirated into the lungs as part of the intrauterine respiratory activity. This phenomenon was present in the authors' youngest fetus, weighing 39 Gm., and at about 12 weeks gestation, and continues throughout the intrauterine life of the fetus. At birth, air is substituted for fluid as a medium of exchange, and the respirations become deeper, regular and continuous.

A point of interest is the fact that fetal swallowing and complete gastrointestinal activity was demonstrated for the first time in a human fetus weighing 39 Gm. 15 figures.

(This paper must surely be ranked as one of the most important of recent contributions to obstetrics since it would seem to settle at last the old question as to the actuality of intra-uterine respiration of the fetus. It has been a long hard struggle.

As far back as 1905 Ahlfeld thought he was able to see, on occasion, characteristic rhythmic movements of the abdomen in slender pregnant women, interpreted these as excursions of the fetal thorax, and even succeeded, by means of a tambour placed on the abdomen, in securing rather convincing tracings of these movements (*Monatschr. f. Geburtsh. u. Gynäk.*, 21, 143, 1905). Subsequent efforts by others, however, to confirm these observations on experimental animals—the mother animals having been anesthetized with ether—were completely unsuccessful. Of course, they did not know at that time, as we do now,

that ether completely inhibits these movements and consequently, for well over a quarter of a century, Ahlfeld's observations were more or less dismissed as figments of the imagination.

The credit for reviving the old idea of fetal respiration is due to F. F. Snyder and M. Rosenfeld. In 1935 or so, while studying an entirely different problem, they were startled to see unmistakable respiratory excursions of the fetal thorax in pregnant rabbits in which the abdomen had been opened under regional anesthesia (transection of the spinal cord). They followed up this fortuitous observation by a series of studies which appeared to prove beyond question that these respiratory movements were not only normal phenomena of intra-uterine life but were associated with an inflow and outflow of amniotic fluid. Again, however, doubt was cast on the whole hypothesis,—this time by Windle and his associates who claimed that the findings of Snyder and Rosenfeld were due to the artificial stimulation produced by the experimental technique. Here, in this state of uncertainty, the matter has rested for the past four or five years until the above, seemingly decisive paper of Davis and Potter appeared.

From a biological viewpoint, the occurrence of these fetal respiratory movements appears logical since other important systems, such as the cardiac, renal and hepatic, function in utero, and it would be singular indeed if the important mechanism of pulmonary respiration, characterized by rhythmic muscular movement, should suddenly start functioning at birth without any preliminary activity. From a clinical viewpoint the existence of fetal respiration has far-reaching implications since we are no longer led to believe that respiration at birth is precipitated by some complicated chemical mechanism which we must try to simulate artificially; on the other hand, with this new viewpoint we are inclined to regard the first breath as a continuation of a delicate, easily arrested mechanism which has been in action for some time. Instead of trying to start something new, the treatment of apnea at birth now becomes an effort to preserve and safeguard a sensitive mechanism already in active existence,—the obvious injunction being: *do no harm to that mechanism.*—(Ed.)

## CALCIUM AND PHOSPHORUS METABOLISM IN PREGNANCY

E. OBERMER

J. Obst. & Gynaec. Brit. Emp., 53: 362-367, 1946

Calcium intake, output and balance figures are presented on 14 further cases—48-hour balance periods at 6-weekly intervals throughout pregnancy. The calcium and phosphorus balances in all cases in the series considered up to date are analysed in 3 groups: Group I. Control on self-chosen diets; Group II. On self-chosen diets, together with a supplement of calcium phosphate; Group III. As Group II, together with large doses of calciferol.

The table of calcium balances shows a marked decrease in negative balances in Group II as compared with Group I, and a still further decrease in Group III. Even in Group III, however, there were 22.5 per cent negative balances. The possibility is discussed that this may be due to an excessive dosage of calciferol.

The table of phosphorus balances shows no difference between Groups I and II with regard to percentage of negative balances—42 per cent. In Group III there is a reduction of the percentage of negative balances to 16 per cent.

Though there was no increase in the plasma inorganic phosphorus figure in the author's Group III cases, the marked increase in urinary phosphorus excretion in relation to fecal phosphorus excretion and the greater proportion of positive phosphorus balances, suggests an important influence on fetal bone growth.

It is concluded that positive calcium and phosphorus balances throughout pregnancy in normal women cannot be ensured by a high calcium and phosphorus intake alone. The addition of calciferol is essential. A survey of the literature reveals the existing ignorance as to the optimum dosage of calciferol during pregnancy. It is hoped that forth-coming studies will throw more light on this matter.

## COMPOSITION OF THE HUMAN PLACENTA

### I. PROXIMATE COMPOSITION

J. P. PRATT, MILDRED KAUCHER, A. J. RICHARDS,  
H. H. WILLIAMS AND I. G. MACY

Am. J. Obst. & Gynec., 52: 402-408, 1946

Placentas were obtained for study from 9 healthy multiparas, following normal deliveries at full term. The proximate composition of the placentas (wet and dry weights, protein, fat, ash and energy) is presented in this paper. The lipid and vitamin distributions are given in following papers, and the mineral analyses will be reported subsequently.

The authors review the structure and function of the placenta. Its purpose is to store and transport nourishment from mother to embryo and, at least in the mammalian type, to provide a mechanism for returning end products of fetal metabolism to the maternal circulation. In man, the contact between maternal and fetal circulations established by the placenta represents an area estimated as between 10 and 13 square meters. The chorionic villi burrow deeply and interfuse with the uterine tissue, and through their semipermeable covering nutriment pass from the maternal blood to the placental blood and excretory products are returned from fetus to mother. The covering of the villi may be able to act upon substances which pass through it, altering their chemical and physical nature. The placenta is well supplied with carbohydrate, protein, fat, enzymes, vitamins, hormones and minerals, and its chemical constitution varies during pregnancy to suit the demands of the growing fetus. In addition to its nutritional and excretory functions, the placenta may well be considered as an endocrine gland.

The 9 placentas analyzed in the present study were washed in saline solution and excess blood, clots and the umbilical cord were removed. Additional saline solution washes were followed by a rinse in double distilled water, after which

the placentas were drained and weighed. They were then ground, frozen and dried to constant weight.

The ratio of infant to placental weight in this study varied from 3.1 to 9.4, with an average of 6.5 to 1. The wet weights of the washed placentas ranged from 327 to 998 Gm., with an average of 583 Gm. Larger birth weights were not indicative of larger placentas, for the heaviest placenta came from the mother of the smallest infant. The dried weights of the placentas varied from 45.2 Gm., the average being 71.8 Gm. The dry substance averaged 13 per cent of the wet weight, and the average moisture content of 87 per cent, ranging from 85 to 94 per cent, shows the human placenta to be an organ relatively high in water, compared with glandular organs and muscle.

The average nitrogen content of the whole placenta was 8.73 Gm. Of the dry weight, the average protein content was 77 per cent, with variations from 68 to 80 per cent. The fat content (ether-soluble) of the placenta varied from 2.3 to 4.5 per cent of the dry weight, averaging 3.8 per cent. In their protein to fat ratios, the placentas averaged 20 to 1. The majority of the total ash values ranged from 5 to 8 per cent of the dry weight, but 2 placentas had ash contents of 13 and 17 per cent, making the average 8.6 per cent, which is somewhat higher than the amount in many animal tissues. The energy value of the dried placenta was about 5 calories per gram, varying from 4.7 to 5.3

## THE ANATOMIC PECULIARITIES OF THE HUMAN UMBILICAL CORD AND THEIR CLINICAL SIGNIFICANCE

MARY SPIVACK

*Am. J. Obst. & Gynec.*, 52: 387-401, 1946

The findings reported in this paper are based on the gross study of 25 human umbilical cords and on the microscopic study of 30 cords, all obtained at or close to term. The author has found that the umbilical vessels differ anatomically from other vessels of similar caliber in several essential ways: (1) in the presence of folds and nodules of Hoboken in the arteries and of semilunar folds in the vein; (2) in the absence of true valves; (3) in the peculiar distribution of elastic tissue (the arterial media contains a considerable amount of elastic tissue, not as continuous structure, but in the form of specks, clumps, or fine wavy fibrils); (4) in the strongly developed arterial media, the powerful contractions of which are ascribed by some authors to the spiral or snail-like course of its muscle fibers; (5) in the absence of vasa vasorum and adventitia; (6) in a very delicate connective tissue stroma which contributes to the sponginess of the vein; and (7) in a nervous apparatus, the existence of which thus far has eluded its positive demonstration. The great contractility of the umbilical arteries is difficult to reconcile with the apparent lack of innervation in their

major portion, but in the author's opinion, no conclusive evidence has been produced to confirm the presence of nerve tissue in the cord proper.

At birth the folds of Hoboken obstruct further the lumina of the arteries, contributing to the mechanism of their closure. Meanwhile, the venous path is allowed to continue to function, thereby safeguarding the circulatory interests of the child. 8 figures.

## REPRODUCTION AND LACTATION IN MICE ON SYNTHETIC DIETS; NUTRITIONAL EFFECTS OF CHOLINE

E. A. WHITE AND L. R. CERECEDO

Federation Proc., 5: 243, 1946

The present investigation was undertaken to study the choline requirement of the albino mouse for reproduction and lactation. Two basal diets were used. Diet A consisted of purified casein, 25 per cent; sucrose 53; Crisco 10; lard 5; salts 5; and Rufflex 2. The following supplements were added per kilo of diet: 10 mg. each of riboflavin, thiamine and pyridoxine; 100 mg. of calcium pantothenate; 5000 I.U. of vitamin D; 40 mg. of alpha-tocopherol; and 2 mg. of beta-carotene. The animals were placed on this ration at weaning, and 23 per cent of the litters were weaned. Better results were obtained when diet A was supplemented with choline (1.5 gram per kilo of diet); on such a ration 36 per cent of the litters were weaned. The diet could be further improved by adding crude folic acid concentrate (one norite adsorption and elution; 1.5 gram per kilo of diet). On this ration 50 per cent of the litters were weaned.

Diet B was the same as diet A, except that the casein content was increased to 33 per cent at the expense of sucrose. No beneficial effect on lactation of the higher protein content was noted. There was distinct improvement when diet B was supplemented with choline (55 per cent of the litters weaned), and further improvement was obtained on addition of the folic acid concentrate (65 per cent of the litters weaned).

the placentas were drained and weighed. They were then ground, frozen and dried to constant weight.

The ratio of infant to placental weight in this study varied from 3.1 to 9.4, with an average of 6.5 to 1. The wet weights of the washed placentas ranged from 327 to 998 Gm., with an average of 583 Gm. Larger birth weights were not indicative of larger placentas, for the heaviest placenta came from the mother of the smallest infant. The dried weights of the placentas varied from 45.2 Gm., the average being 71.8 Gm. The dry substance averaged 13 per cent of the wet weight, and the average moisture content of 87 per cent, ranging from 85 to 94 per cent, shows the human placenta to be an organ relatively high in water, compared with glandular organs and muscle.

The average nitrogen content of the whole placenta was 8.73 Gm. Of the dry weight, the average protein content was 77 per cent, with variations from 68 to 80 per cent. The fat content (ether-soluble) of the placenta varied from 2.3 to 4.5 per cent of the dry weight, averaging 3.8 per cent. In their protein to fat ratios, the placentas averaged 20 to 1. The majority of the total ash values ranged from 5 to 8 per cent of the dry weight, but 2 placentas had ash contents of 13 and 17 per cent, making the average 8.6 per cent, which is somewhat higher than the amount in many animal tissues. The energy value of the dried placenta was about 5 calories per gram, varying from 4.7 to 5.3

## THE ANATOMIC PECULIARITIES OF THE HUMAN UMBILICAL CORD AND THEIR CLINICAL SIGNIFICANCE

MARY SPIVACK

Am. J. Obst. & Gynec., 52: 387-401, 1946

The findings reported in this paper are based on the gross study of 25 human umbilical cords and on the microscopic study of 30 cords, all obtained at or close to term. The author has found that the umbilical vessels differ anatomically from other vessels of similar caliber in several essential ways: (1) in the presence of folds and nodules of *Hoboken* in the arteries and of semilunar folds in the vein; (2) in the absence of true valves; (3) in the peculiar distribution of elastic tissue (the arterial media contains a considerable amount of elastic tissue, not as continuous structure, but in the form of specks, clumps, or fine wavy fibrils); (4) in the strongly developed arterial media, the powerful contractions of which are ascribed by some authors to the spiral or snail-like course of its muscle fibers; (5) in the absence of vasa vasorum and adventitia; (6) in a very delicate connective tissue stroma which contributes to the sponginess of the vein; and (7) in a nervous apparatus, the existence of which thus far has eluded its positive demonstration. The great contractility of the umbilical arteries is difficult to reconcile with the apparent lack of innervation in their

flat films, one showing the birth canal from above downwards, from which inlet and midplane measurements may be obtained, and a second film taken laterally from which inlet, midplane and outlet measurements may be obtained. In addition, the following pelvic measurements will be helpful:

Pelvic inlet—anteroposterior, transverse, posterior sagittal diameters.

Pelvic midplane—anteroposterior, transverse, posterior sagittal diameters.

Pelvic outlet—symphysis-biparietal, sacral-biparietal distances.

9 figures.

(It looks very much as if external pelvimetry has had its day, for the above article indicates that its last stronghold, outlet pelvimetry, is about to collapse. The fact that our leading authority on pelvimetry finds mensuration of the outlet unsatisfactory will prove consoling news to many obstetricians because the majority of us, I believe, have been rather skeptical from time to time about the accuracy of our estimation of the intertuberos diameter and even more so in regard to the posterior sagittal. Let half a dozen obstetricians of experience, for instance, take these measurements on the same patient and I would venture a wager that the variations in the former diameter will run 1 to 2 cm., and those in the latter still greater. When we come to think of it, moreover, even the normal measurement for the intertuberos diameter as given in all textbooks—11 cm.—is disturbing because in very few women, in my experience at least, can any such measurement be obtained, the figure being usually nearer 9 than 11. Moreover, clinical measurements of the outlet rarely jibe with x-ray findings, the latter tending to be much larger.

But the significance of the above paper lies not so much in the isolated observation it makes on outlet pelvimetry as in the relationship it bears to Thoms' previous communications on external pelvimetry in general. For many years, it will be recalled, he has been a vigorous assailant of the other external measurements and in 1935 wrote as follows: "My experience with roentgen pelvimetry has made me quite skeptical as to the emphasis which has formerly been given to external pelvimetry as applied to the pelvic inlet. This is no new conception. Ever since the time of Baudeloque various observers have questioned the value of these procedures. Criticism has been directed especially toward the method of determining the length of the true conjugate by the subtraction of certain figures from the length of the external conjugate." (The Obstetric Pelvis, Williams & Wilkins Co., Baltimore, 1935.) He then goes on to substantiate this statement by showing that the external conjugate and true conjugate diameters are not in the same plane and bear no constant relationship to each other. He likewise adduces evidence to show that the intercrystal diameter is of no value as an index of the transverse diameter of the inlet. Nevertheless, although critical of these external measurements, he was still maintaining in 1935 that external pelvimetry of the outlet was of value. "As stated above," he wrote in the same book, "external pelvimetry is not of great value in determining the conformation of the inlet, but such is not the case with that of the pelvic outlet. If we recall that the chief bony processes that form the pelvic outlet are easily palpable externally the verity of the above statement becomes apparent." Today, however, after a decade more of study and thought, his opinion is reversed and the conclusion is reached that even these outlet measurements are unreliable,—indeed, just about as unreliable as the others. This amounts up to saying, of course, that no external measurement is of much value.

What does all this mean for the practice and teaching of obstetrics? It means in all probability that we are in for a considerable revolution during the next few years in our way of handling pelvimetry,—a revolution during which external pelvimetry will gradually slip into the limbo of obstetric history and be replaced by x-ray pelvimetry. This may seem like a radical forecast but in my opinion the evidence against external mensuration is too overwhelming to warrant its continuation. In my own clinic we long ago abandoned the



# MANAGEMENT OF NORMAL PREGNANCY, LABOR AND PUERPERIUM

## OUTLET PELVIMETRY; A COMMENTARY, AND THE PRESENTATION OF A PELVIMETER FOR MEASURING THE "SYMPHYISIS AND SACRAL BIPARIETAL DISTANCE"

HERBERT THOMS

Surg., Gynec. & Obst., 83: 399-402, 1946

The author concludes that pelvic outlet pelvimetry at present is not satisfactory because transverse dimensions cannot be accurately determined either by manual or roentgenological means. In the former case, the estimation may be variable because of a lack of definite palpable end points for the intertuberal or transverse diameter. Roentgenologic methods for depicting the pubic arch are unsatisfactory because of distortion difficulties.

The relationship between the pelvic outlet and labor is useful to consider. With a normally shaped pubic arch with adequate capacity the head extends with the occiput in close contact with the subpubic angle, and under these circumstances the arc described by the extending sinciput is minimal and the likelihood of perineal damage is also minimal. Should the subpubic angle be narrow and the capacity of the arch thereby lessened, the head is forced backward, the arc of the extending sinciput is lengthened, and the liability of damage to the maternal soft tissues is increased.

Because of variations in the downward course of the pubic rami, the degree of the pubic angle in itself may not give a reliable index to outlet capacity. As an alternative to determining the subpubic angle and attempting to determine a transverse outlet diameter, Allen has recommended the measurement of the symphysis-biparietal distance. This is the distance within which a normal biparietal diameter cannot approach the lower edge of the symphysis. Thoms presents in this paper a palpatory method for determining this measurement. He uses a pelvimeter which consists of a crossbar of 9 centimeters, allowing thereby about 0.5 centimeter for the thickness of the soft parts covering the pubic rami in their medial aspect.

The pubic arch is thoroughly palpated bimanually, and the course of the rami downward is noted, whether straight, moderate or widely arcuate. The crossbar of the pelvimeter is then brought to fit snugly between the rami. It is held in this position while the arm of the pelvimeter is placed at the lower edge of the symphysis, and the symphysis-biparietal distance is read from the scale. The sacral biparietal distance is measured by holding the crossbar in position and swinging the arm posteriorly to the sacrococcygeal junction—one centimeter is deducted from the reading to compensate for the thickness of the lower sacrum.

A survey for determining the adequacy of the bony pelvis for childbearing should include roentgen and palpatory methods. The former should include 2

3. Lateral in erect posture.

4. Subpubic arch projection.

In all cases a true reduced chart of the pelvic inlet, showing its true size and shape, was made, and fetal head models directly compared against these 2-plane charts. Accurate cephalometry is far from easy to achieve because of obvious factors operating during labor. The authors are therefore dubious about the value of painstaking cephalometry and prefer to consider a fetal head as average, small or large for its maturity.

The written prognosis or predictions have been grouped under 5 headings, as shown below. The assessment of the accuracy of the prediction has been made independently by the obstetrician.

Group A: No disproportion, normal delivery, no reservations.

Group B: No disproportion; normal delivery with minor reservations.

Group C: Minor disproportion; difficult delivery but normal feasible.

Group D: Moderate disproportion; abnormal delivery, normal most improbable.

Group E: Severe disproportion; abnormal delivery, normal impossible.

Table II shows the follow-up assessments of the radiological prediction in these various groups. Cases delivered by cesarean section have provided no test of prediction, and are therefore listed as "not assessable."

From these figures it may be summarized that in the series of 222 cases delivered without any manifestation of disproportion, 200 cases (90 per cent) were predicted as likely to have delivery without disproportion. Of 54 cases having abnormal deliveries due to disproportion, 51 (94.4 per cent) were predicted as likely to have abnormal or difficult deliveries because of disproportion. Of the entire series of 300 suspect cases referred by expert clinicians, the prediction was wholly "correct" in 83 per cent of the 253 assessable cases and "substantially correct" in 90.11 per cent; the difference between "wholly correct" and "substantially correct" being explained by the inclusion in the "substantially correct" figures of those cases with forceps-aided deliveries, but without signs of disproportion during labor. 6 figures.

## RESIDENTIAL REST DURING THE ANTENATAL PERIOD

G. M. ALLEN-WILLIAMS AND I. SUTHERLAND

J. Obst. & Gynec. Brit. Emp., 53:278-284, 1946

A series of 571 maternity cases has been reviewed and all cases presenting abnormalities have been excluded from the subsequent analysis, which deals with 443 completed normal and spontaneously delivered cases. These fell into 2 groups which were compared in respect to length of labor and birth-weight of the child. The first group of 257 patients (206 primigravidae and 51 multiparae) was admitted in labor and delivered in a hospital, while the second group of 186 patients (110 primigravidae and 76 multiparae) had had a period of residence in

external conjugate because it can be a most misleading measurement; the intercrystal and interspinous diameters have also been given up as without clinical value; and more and more reliance is being placed on roentgen findings. For many years Thoms has urged routine x-ray pelvimetry in all primigravidae and it seems likely that we shall all be coming to this before long. After all if pelvimetry is worth doing at all it is worth doing accurately. —Ed.)

## THE VALUE OF ANTENATAL RADIOLOGICAL PELVIMETRY; A COMPARATIVE SURVEY OF THE PREDICTION AND EVENT IN 300 SUCCESSIVE PELVIMETRIC STUDIES AT QUEEN CHARLOTTE'S MATERNITY HOSPITAL

E. R. WILLIAMS AND L. G. PHILLIPS

J. Obst. & Gynaec. Brit. Emp., 53: 125-139, 1946

This paper is an attempt to assess the reliability of prediction of the course of labor from antenatal radiological examination alone. A comparison has been made of the radiological prediction and the eventual mode of delivery in 300 pelvimetric cases at Queen Charlotte's Hospital between 1942 and 1945. While there was no radiological selection of material, every patient referred presented a distinct antenatal problem, and in each case some guidance was sought.

TABLE II. (Williams and Phillips)  
*Radiological Prediction Groups and Follow-up Assessments*

	PREDICTION GROUPS					TOTAL ALL GROUPS
	A	B	C	D	E	
Total cases.....	186	38	30	25	21	300
Not assessable.....	11	7	6	8	15	47
Correct.....	159	27	11	9	4	210
Forceps aided, no disproportion.....	15	3	—	—	—	18
Incorrect.....	1	1	13	8	2	25
Substantially correct.....	174	30	11	9	4	228
Total assessable.....	175	31	24	17	6	253

	PERCENTAGE FIGURES OF TOTAL ASSESSABLE		
	A	B	Total
	%	%	%
Correct.....	90.86	87.10	83.0
Forceps aided, no disproportion.....	8.57	9.68	7.11
Incorrect.....	0.57	3.22	9.89
Substantially correct.....	99.43	96.78	90.11

Briefly, the technique of radiological examination included the following projections.

1. Anteroposterior of whole pelvis and lower spine, patient supine.
2. Supero-inferior of pelvic inlet.

There are 2 stages or degrees of the method. In the first, the dosage (usually 1-2 cc. per min.) is such that normal consciousness and other functions are undisturbed and the rate of injection is not associated with dizziness or mental confusion; harm or danger seems absent and complete or incomplete analgesia is obtained. In the second stage, the higher dosage (8-20 cc. plus per min.) produces semi- or unconsciousness in which all pain is abolished, but the patient remains more or less responsive. The difficulty associated with this stage has been the occurrence or threat of convulsions. With proper management and continuous watching of the patient this threat can be obviated, by using a barbiturate before beginning the procaine infusion and then watching for signs of impending convulsions (twitching of facial or other muscles and hyperactive reflexes) and either reducing the rate of infusion or stopping it entirely.

In the 20 cases reported, pain in the early stages of labor was greatly reduced by the slow rate of injection. Thorough anesthesia with partial loss of consciousness during delivery and perineal repair was obtained by the fast infusion rate. Three patients required delivery by outlet forceps. One convulsion occurred in a 24 year old primipara with a breech presentation who had severe pre-eclampsia. Here the infusion was discontinued and ether substituted for delivery.

Although this series of cases is encouraging as regards to safety to mother and child and as an effective means of producing analgesia and anesthesia, it is obviously a small basis for recommendation of a new anesthetic method. Prudence, reservations and wider experience are still necessary.

## SADDLE BLOCK ANESTHESIA WITH NUPERCALINE IN OBSTETRICS

R. T. PARMLEY AND J. ADRIANI

*Am. J. Obst. & Gynec.*, 52: 636-640, 1946

Saddle block is a form of low spinal anesthesia confined to the perineal region. This distribution of anesthesia can be obtained by adding glucose to the drug desired (nupercaine, in obstetrics). This causes the solution to be heavier than spinal fluid, and when injected into the subarachnoid space with the patient in the sitting position, the solution gravitates downward into the conus of the dural sac. The extent of anesthesia can be modified by varying the time the patient remains in the sitting position after injection. Thus, complete loss of sensation in the perineum, relaxation of the perineal muscles, hypalgesia and analgesia of the legs and thighs without paralysis can be obtained. This is simpler, safer, similar and more precise than caudal block.

The technique and materials for performing a saddle block are similar to those of any spinal anesthesia. Two and one-half mgm. of nupercaine ( $\frac{1}{2}$  cc. of 1:200 solution) is thoroughly mixed with  $\frac{1}{2}$  cc. of 10 per cent glucose in normal saline or water prior to the lumbar puncture. With the patient in the sitting

an antenatal hostel before admission to a maternity home for delivery. The average time spent in the hostel was 26 days (0-74 days), and here the women were looked after, followed a regular routine and had no household cares. The women admitted to the hospital in labor were, until that time, either in employment or had domestic responsibilities. The 2 groups were alike in age distribution and economic status, received comparable diets throughout pregnancy and had routine antenatal supervision.

The mean duration of labor was significantly longer in the hospital series, both for multiparae and primiparae. Among primigravidae the mean duration of labor in the hospital series was 17.46 hours, in the maternity home cases 13.12 hours. Among multiparae the mean duration of labor in the hospital cases was 10.73 hours, in the maternity home cases 7.60 hours. In the hospital series the difference at all ages was 6.7 hours, and in the maternity home 5.5 hours —values which are statistically significant.

Among the primiparae aged 15-25 delivered in the maternity home, for those who had been in residence in the hostel up to 9 days the mean duration of labor was 7.64 hours, while for women who were in the hostel more than 40 days the duration of labor was 13.71 hours, or 80 per cent greater. Eastman has indicated the desirability of employment with adequate precautions up to 6 weeks before term, and the findings in the present series suggest that too early cessation of outside work is not always favorable to short labor.

There was no evidence in this series of cases that the antenatal routine had any effect on the birth-weight of the baby in either group, and no significant difference was revealed in the initial ability to breast feed in relation to the duration of antenatal residence.

It is suggested that these findings might be accounted for on psychological grounds, but further research is required for proof.

## INTRAVENOUS PROCAINE FOR OBSTETRICAL ANESTHESIA

K. JOHNSON AND C. R. A. GILBERT

Current Researches in Anesth. & Analg., 25: 133-146, 1946

The authors have used continuous procaine infusion for analgesia and anesthesia in labor on an additional 20 cases, to make a series of 32 without a death or serious accident.

A one per cent solution of procaine in 5 per cent glucose is routinely used (1000 cc. of 5 per cent glucose plus 10 gms. of procaine). Every patient is tested first for procaine sensitivity by injecting a drop of 2 per cent solution intradermally and waiting 15 minutes for a reaction. If negative or doubtful, one drop is placed in the eye for verification.

so as to point toward the sacral canal. It then perforates the posterior sacrococcygeal ligament and continues to penetrate until it reaches the right place. The left finger maintained in the rectum assures the right position of the needle. The rubber tube and syringe are then attached to the needle by means of the right hand, and following the usual aspiration the anesthetic is injected. The rectal finger certifies that the latter is being correctly introduced. It is afterward removed from the rectum and the external glove taken off with all the precautions necessary.

Following this technique, the exact position of the sacrum and its canal can be more easily determined, especially in obese patients, and the false roots avoided, particularly the internal ones, which are by far the more dangerous.

position (in bed or on the delivery table) a needle is introduced into the subarachnoid space in the 3rd or 4th lumbar interspace. Without aspirating more than  $\frac{1}{10}$  cc. of spinal fluid, inject the prepared solution gently and rapidly (2 seconds). Allow the patient to sit upright for exactly 30 seconds; then place her in the recumbent position with her head on a pillow for at least 15 minutes. The solution should not be introduced during a contraction for fear of spreading the drug in the spinal canal.

This type of block was used in 136 cases of the authors' series (normal primipara or multipara). The anesthesia was begun when uterine contractions were every 3 to 4 minutes, the cervix 5 to 6 cm. dilated, and 60 to 80 per cent effaced. The results were gratifying. The average duration of analgesia was 3 hours, sometimes 5. Eighty-one per cent had complete relief during labor and delivery. Fourteen per cent complained of slight pain. In 5 per cent of the cases the block was unsuccessful probably because of an error in technique. A single block was sufficient in 68 per cent of the cases; the rest required repeated blocks.

The usual hazards and complications of spinal anesthesia were notably low in this series. Nausea and vomiting occurred in 13 per cent (did not occur after fluids and food were restricted). Blood pressures fell an average of 10 mm. systolic in 50 per cent of the cases. There were no cases of respiratory depression or embarrassment. No rectal or urinary incontinence, no post spinal headache and no backache occurred. There was no urinary retention, no distension, ileus, meningismus nor palsies.

## CONTRIBUTION TO THE CLASSICAL TECHNIQUE OF APPLICATION OF THE CONTINUOUS CAUDAL ANESTHESIA

JESUS CARMONA ALVAREZ

Gynec. y Obst. de Mexico 1: 35-39, 1946

The author reports a modification of the classical technique for continuous caudal anesthesia, which facilitates its application.

It consists in a simple, good and safe way of identifying the sacrococcygeal articulation, which can be performed through the rectum.

Following an enema, the patient lies on her right side with the left thigh bent upward and the left leg in flexion over the latter. The region is cleansed as usual and by using 2 gloves on the left hand the middle finger is introduced into the rectum in order to identify the cocyx. By moving the latter, the sacro-coccygeal articulation is identified. The indicator finger of the right hand feels externally these movements, so that the sacrum's points of reference are determined, at least its hiatus. With the left finger still kept within the rectum, the right hand inserts the needle in the point previously marked (4 to 6 millimeters above the sacro-coccygeal articulation) perpendicularly to the skin. After the needle has gone into contact with the posterior wall of the sacrum, it is inclined downward

raised to about -5 to 0 per cent or slightly higher if no symptoms of excessive dosage appear.

Hamblen and others still use gonadotrophins in their treatment of habitual abortion. The author uses pregnancy serum in the composite treatment; 20 cc. of sterile serum from a pregnant donor is injected intramuscularly each month up to the sixth month.

General measures, including bed rest and avoidance of coitus, are of importance in preventing abortion. The author feels that too little emphasis has been placed on diet, and recommends a high protein diet with adequate vitamins before conception and throughout pregnancy and lactation.

Hertig and Livingstone, in a study of 681 cases of so-called habitual abortion, found that 82.8 per cent went through pregnancy on treatment. Kotz and his associates reported 17 cases of true habitual abortion wherein 94.1 per cent went through pregnancy successfully with treatment.

(The use in the above article of such terms as "true habitual abortion" and "so-called habitual abortion" is indication enough that this entity has been variously defined and throughout his paper Hunt rightly deprecates the confusion which has attended this circumstance. Most obstetricians, perhaps, classify in this category patients who have had two or more consecutive, spontaneous abortions; others specify three or more; while still others use the term loosely to indicate a tendency to abort regardless of how the sequence of these accidents falls in with the delivery of term infants. Not only for the purpose of evaluating and comparing the results of treatment but for many other reasons it would seem desirable to establish a uniform definition of this term.

The general connotation of the term "habitual abortion" is well known to us all, namely: *sequential abortion in such number as to leave little doubt that some recurrent etiologic factor is responsible.* This would seem to be a satisfactory enough generalization but to convert it into a working definition it is obvious that we should know how many consecutive abortions a woman must have before there "is little doubt that some recurrent etiologic factor is responsible." With the data now at our disposal it is possible to do this in a logical and fairly accurate manner.

The incidence of spontaneous abortion in general has been established as very close to 10 per cent of all pregnancies. Hertig has examined all the abortuses from a large obstetric practice in Boston over a period of six years and has found the incidence of spontaneous abortion to be 10.6 per cent in 1150 pregnancies; he also summarized the observations of five American authors and concluded that this combined experience showed an average incidence of 9.8 per cent for spontaneous abortion. (See Hertig, A.: *New England J. Med.*, 230, 797, 1944—an excellent survey with full bibliography.) Other reported figures are of the same order.

As pointed out by Malpas in 1938, all cases of spontaneous abortion may be regarded as falling into two main categories (*J. Obst. & Gynaec. Brit. Emp.*, 45, 932, 1938). On the one hand, there is a group in which abortion is the result of random or fortuitous factors which are not likely to repeat themselves in succeeding pregnancies except again by chance. On the other hand, there is a group in which some condition inimical to the growth of the ovum recurs in each pregnancy. In Hertig's opinion the proportion of habitual abortions in all spontaneous abortions probably lies somewhere between 3.6 and 9.8 per cent. If Bishop's figure of 0.41 per cent is used as representing the absolute incidence of habitual abortion in pregnancy, and it is recalled that 10 per cent of all pregnancies abort spontaneously, the percentage of spontaneous abortions that are due to recurrent factors is 4.1.

On the basis of the above estimates it would appear, then, that about 9.6 per cent of all pregnancies terminate in abortion as the result of random factors and that 0.4 per cent



# **PATHOLOGY OF PREGNANCY**

## **HABITUAL ABORTION**

**A. B. HUNT**

**M. Clin. North America, 30: 965-973, 1946**

The author reviews the problem of habitual abortion from the etiologic and prophylactic viewpoints. It is concluded that although treatment for habitual abortion has an indirect effect on the patient which Hamblen has called "psychologic conditioning", nevertheless, until well-controlled series of cases of habitual abortion without treatment are presented with results matching those that have been reported with treatment, the obstetrician and gynecologist are still justified in attempting to treat the condition.

Etiologic factors in habitual abortion may be: defective oogenesis or spermatogenesis; thyroid hypofunction; serologic disturbances; vitamin deficiencies (especially of vitamins E, C and K); disturbances of glycogen metabolism and storage in the endometrium; disturbances of the anterior pituitary and corpus luteum; and disturbances in estrogen production. Many observers have shown that in approximately two-thirds of spontaneous abortions the ovum is grossly defective. The role of vitamins E, C, and K in habitual abortion is not definitely established. There is more agreement concerning low basal metabolic rates, and administration of desiccated thyroid in doses measured by the rate is indicated. Studies of pituitary and ovarian function in the pregnancies of patients subject to habitual abortion have been sketchy. Vaux and Rakoff have presented evidence of low levels of estrin and pregnandiol for which they believe treatment with estrogen and progesterone is merited, and their results from such treatment seem encouraging.

Results are much better if patients with habitual abortion are treated prophylactically as soon as conception can be demonstrated, rather than to employ active treatment after abortion is actually in progress. If progesterone is employed, from 10 to 30 mg. of anhydrohydroxy progesterone may be given daily and in many cases progesterone also is given intramuscularly in doses of from 2 to 10 mg. every other day or twice a week. This treatment is continued through the first  $4\frac{1}{2}$  to 5 months of pregnancy. If spotting or cramping ensues, the dose of intramuscular progesterone should be increased to from 10 to 20 mg., given daily until signs of abortion subside. Both estrogen and progesterone seem needed for the proper metabolism of each one. Diethylstilbestrol, from 1 to 10 mg. daily, may be given; usually the lower range of this dose is employed, especially in the early weeks of pregnancy.

The value of the administration of desiccated thyroid in cases of low basal metabolic rates has already been mentioned. The basal metabolic rate should be

## RETINAL ARTERIOLES IN THE HYPERTENSIONS OF PREGNANCY

ALTON V. HALLUM

Transactions of the American Ophthalmological Society, Eighty-First Annual Meeting, Hot Springs, Virginia, 1945

During the past 14 years the author has studied the eyegrounds of approximately 2500 women suffering from hypertension during pregnancy. Two previous reports analyzed the observations made on some of these patients, and an attempt was made to correlate the eyeground changes with the degree of toxemia. It was found that the frequency and degree of eyeground changes more closely followed the severity of hypertension, and consequently the toxemia, than any other single laboratory or clinical sign. The one outstanding and consistently reliable change observed in the eyegrounds was the degree of general and localized spastic constriction of the retinal arterioles.

## ANATOMY OF THE RETINAL ARTERIOLES

Knowledge of the structure of the walls of the retinal arterioles helps one to better understand the local manifestations of angiospasm. The central artery in the optic nerve has the same histologic characteristics on microscopic sections as arteries of similar size in other parts of the body. Its muscular coat has a thickness of about one-eighth the diameter of the lumen of the artery. But as Friedenwald cites, "On passing through the cribriform lamina the artery is very markedly altered. The internal elastic lamella becomes reduced to a single thin layer and disappears entirely after the first or second bifurcation. The muscular coat becomes reduced to a single layer of muscular fibers, and after one or two bifurcations the fibers no longer form a continuous layer but are separated from one another by small gaps. Since, by definition, arteries which do not possess an internal elastic lamella nor a continuous muscular coat are classified as arterioles, the whole retinal arterial tree except for those branches in or close to the optic disc is arteriolar."

## ESSENTIALS OF OBSTETRIC OPHTHALMOSCOPY

The present discussion is intended primarily for the obstetrician, appealing to him to do his own ophthalmoscopy. Of course, the best time to learn to use the ophthalmoscope is during the internship, when one is younger, and more adept at learning new procedures. However, the obstetrician who had no training in the use of the ophthalmoscope during his hospital days can within a few weeks acquire the ability to gain invaluable information from the eyegrounds of almost every patient exhibiting hypertension during pregnancy. During the course of severe and moderately severe toxemia of pregnancy the most information is gained from the eyegrounds by making repeated examinations daily or every few days. A consultant ophthalmologist will be called in only one time, or not at all, and if the obstetrician cannot do his own ophthalmoscopy the patient is the loser. Occasionally, she pays with her life or with the life of her baby, when the obstetrician does not recognize the progress and severity

approximately end in abortion because of some recurrent circumstance. With these figures in mind let us follow 100,000 women through successive pregnancies and calculate the incidence with which repeated abortion might be expected to occur. Of these women, 9600 would abort in their first pregnancy as the result of random factors and 400 because of recurrent causes, a total of 10,000 abortions, or 10 per cent. Now, if these 10,000 women, each with a history of one abortion, are followed in a similar manner through their second pregnancies, 922 (9.6 per cent of 9600) will abort from chance causes, while the same 400 who aborted in the previous pregnancy from recurrent factors, will do so again. In other words, only 13.2 per cent of these patients with one previous abortion repeat in the next pregnancy. Since 86.8 per cent do not abort, the spontaneous cure rate is 86.8 per cent.

Table 1 follows these same women through four pregnancies and shows that after two consecutive spontaneous abortions, a patient in any third gestation has almost two chances out of three (63.1 per cent) of a successful term pregnancy without any therapy whatsoever. This fact is important for several reasons: (1) In dealing with patients who have had two previous abortions a physician is justified in offering a fairly optimistic outlook for any third gestation. (2) In the evaluation of any therapy given to such women in their third pregnancies, the physician must be wary because two out of three will go to term satisfactorily without treatment. (3) Our current definition of habitual abortion, based on two consecutive spontaneous abortions, is inept and misleading; on the one hand it has given rise to undue pessimism in regard to the natural outcome of subsequent pregnancies in such cases; and, on the other, it has resulted in unjustified optimism in the evaluation of therapy.

Between a woman who has had two consecutive abortions and one who has had three, there is a great difference in prognosis, the spontaneous cure rate falling from 63.1 to 16.4 per cent. Certainly, when the outlook for a subsequent pregnancy is as poor as it is in this latter group, with only one chance in six of success in any subsequent gestation, we are fully justified in postulating a recurring factor. There is good reason for believing, accordingly, that habitual abortion should be defined as *a condition in which a woman has had three or more consecutive, spontaneous abortions*. As indicated in the preceding paragraph, the definition of this condition is not merely of academic interest but has far-reaching clinical implications, particularly in regard to the evaluation of therapy.—Ed.)

TABLE 1

*Showing how 100,000 women will behave in successive pregnancies in respect to repeated abortion*

NUMBER OF CASES	PREVIOUS ABORTION	WILL ABORT FROM ACCIDENTAL CAUSES	WILL ABORT FROM RECURRENT CAUSES	TOTAL ABORTIONS	PER CENT WILL ABORT	SPONTANEOUS CURE RATE
100,000	0	9,600	400	10,000	10.0	—
10,000	1	922 (9.6% of above figure)	400 (Same 400)	1,322	13.2	86.8
1,322	2	88 (9.6% of above figure)	400 (Same 400)	488	36.9	63.1
488	3	8 (9.6% of above figure)	400 (Same 400)	408	83.6	16.4

The calculations are based on the assumption that 10 per cent of all pregnancies terminate in spontaneous abortion, 9.6 per cent from accidental causes and 0.4 per cent from recurrent factors. Even though the figures, 9.6 and 0.4, are changed considerably, the result is about the same. Thus, Malpas who first suggested this approach, employed 17 and 1 and calculated spontaneous cure rates of 78.4, 62.0 and 27.0 per cent respectively, instead of those given in the right hand column above.

of localized constriction. When there is a generalized arteriole constriction beyond the ratio of 2 to 1, it is increasingly difficult to recognize localized variations in the diameter of the lumen.

In estimating the vein arteriole ratio one must be sure that he is comparing the diameter of a principal vein and its corresponding arteriole. The best place to make this determination is about 1 D. D. distance from the disc margin, using either the superior temporal vessels or the inferior temporal vessels, and being sure that neither the vein nor arteriole has divided before reaching that point. If either the vein or arteriole has divided before reaching the point of comparison a wrong ratio will be obtained.

The arteriole constrictions are proven to be spastic in nature when the degree and location can be seen to vary at subsequent examinations. Many patients were examined a few days after delivery, when the blood pressure had returned to normal, and the formerly constricted arterioles had resumed their normal caliber and normal ratio. These constricted arterioles did not show compression of the veins at the arteriovenous crossing, nor did they show increased light reflex stripe. In fact, where there is noticeable angiospasm the light reflex is actually decreased.

Since the surface of the blood column is narrowed by the constrictions of the arteriole wall, the light reflex is also narrowed. Actually, in sclerosis the constriction is usually unsymmetrical. The widened reflex at the site of blood column narrowing indicates that the thickened wall is producing most of the reflex and that the thickening of the arteriole wall is greatest in this section.

#### CLASSIFICATION OF RETINAL ARTERIOLAR SPASM

For the convenience of easier description the following classification of retinal arteriolar spasm in toxemia of pregnancy is suggested. The classification is based on the degree of arteriolar spasm, and usually indicates the severity and duration of the toxemia.

Grade 1. The spasms are localized in nature, and may be limited to one or more points. They are usually seen in the proximal portion of the arterioles. The general diameter ratio of vein to arteriole is the normal ratio of 3 to 2, or there might be a slight increase in this ratio.

Grade 2. The arterioles show a generalized constriction so that the diameter ratio of vein to arteriole is 2 to 1. Usually there are also localized constrictions of the arterioles.

Grade 3. The degree of generalized arteriole constriction has increased until the diameter ratio of vein to arteriole is 3 to 1. Fine localized constrictions in the arterioles are usually present, but are difficult to distinguish.

Grade 4. The degree of generalized arteriole constriction has progressed until the diameter ratio of vein to arteriole is 3 to 1 or more, and there is some degree of retinopathy. (Retinopathy will occasionally be seen in Grade 3 or even in Grade 2 arteriolar spasm, especially if the localized constrictions are marked and if the toxemia is sudden and severe in nature.)

of the toxemia and fails to terminate pregnancy. The eyegrounds is probably the best single indicator of the progress and severity of the toxemia.

In the early stages of learning the use of the ophthalmoscope, some help in the fundamentals from one's fellow ophthalmologist will be of great value. A good ophthalmoscope is essential, preferably one with the May head, and the illumination must always be bright. The most satisfactory ophthalmoscope and source of light is the giant electric ophthalmoscope which operates off the house current, using the same small portable transformer that operates the usual office cautery.

Another essential requirement for good ophthalmoscopy is the dilation of the pupils. Instill inside each lower lid one drop of a weak mydriatic, as pare-drine hydrobromide ophthalmic 1 per cent, and in 20 to 30 minutes the pupils will be semi-dilated. They will remain semi-dilated for an hour or two, but accommodation is only slightly impaired. The examination of the fundi can be much more efficiently done in a semidark or dark room. If the patient is to go out into bright sunshine after this examination, it might be preferable to hasten the contraction of the pupils by instilling into each eye one drop of a weak miotic as 0.1 per cent eserine salicylate, or 0.5 per cent pilocarpine. However, warn the patient that in a few minutes she will probably experience twitching of her lids and possibly a drawing sensation in her eyes. This ciliary spasm lasts only a few minutes, but often produces much more discomfort than does the small amount of photophobia, and for that reason the miotic had probably best be omitted.

#### SPASMS OF RETINAL ARTERIOLES

The first change observed in the normal retinal arterioles during a true toxemia of pregnancy is constriction of the lumen. This constriction might be localized to a single point resembling a sausage-link constriction, as if a single fine silk thread partially constricts the arteriole. There can be a series of these localized constrictions, some elongated and spindle-shaped and usually limited to the first half of the retinal arteriole. This is the portion of the arteriole nearest the optic disc and they are seen more frequently in the nasal branches. These elongated spindle-shaped constrictions appear as uniformly symmetrical indentations of both sides of the arteriole, and resemble the constriction that would be produced by stretching a glass tube the middle section of which had been heated almost to the melting point. In searching for these localized constrictions one must adjust the ophthalmoscope to its very best focus, and if while looking at a section of an arteriole he slowly rotates the ophthalmoscope to and fro, he will often bring the outline of the constrictions into better view.

In other patients the first change observed might be a generalized arteriole constriction, so that instead of the diameter ratio of vein to the arteriole being the normal 3 to 2, the arterioles might be constricted so that the ratio is 2 to 1. As the severity of the toxemia progresses the arterioles are usually seen to become more constricted until the ratio increases to 3 to 1, or more. Usually those patients showing generalized arteriole constriction also show varying degrees

of localized constriction. When there is a generalized arteriole constriction beyond the ratio of 2 to 1, it is increasingly difficult to recognize localized variations in the diameter of the lumen.

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## ARTERIOLAR SPASMS SUPERIMPOSED ON ARTERIOLARSCLEROSIS

Spastic arteriolar constrictions are often seen superimposed on chronic vascular disease, indicating that the existing toxemia of pregnancy has caused spastic constrictions of arterioles that previously had undergone sclerotic changes. When branches or portions of branches of the arterioles show constriction without an increase (or indeed with a decrease) in the light reflex it is likely that there is angiospasm present.

Sclerotic changes are indicated by the usual signs of retinal arteriolar sclerosis, the most reliable change being that of compression of the vein at the arteriovenous crossing. Unsymmetrical constrictions of the lumen of the arterioles in contrast to the symmetrical constrictions seen in angiospasm is an indication of organic change in the arteriole wall. The reflex stripe is an unreliable guide in estimating retinal arteriolar sclerosis, but when there is a marked increase in the light reflex stripe or when narrowed portions of an arteriole show an increase of light reflex, it is likely that there is vascular disease. Increased tortuosity of the arterioles is usually not seen until a marked degree of arteriolar sclerosis has occurred, and then it is best seen in the terminal and very small arterioles. In a high percentage of such cases it is impossible on a single examination to be positive whether the changes are spastic or sclerotic in nature, or whether a combination of the two changes is present. If subsequent examinations, days, weeks, or months later reveal the disappearance of the arteriole constrictions, it would be proof of their spastic nature; if the constrictions remain unchanged, or tend to increase, it would tend to indicate permanent changes in the walls of the arterioles.

## RETINOPATHY

As the retinal arterioles become more constricted there are seen signs of retinal ischemia, as edema of the retina, hemorrhages, and exudates. Edema of the retina is usually the first sign of involvement of the retina, and it usually makes its appearance at the upper and lower poles of the disc, and progresses away from the disc along the course of the retinal vessels, which is likewise the general course of the nerve fibers of the retina. In the earliest stage of edema of the retina the portion involved appears milky, and on close examination with the very best focus of the ophthalmoscope while doing a very gentle and slow to and fro rotation of the hand holding the ophthalmoscope, the surface shows faint striations running in the direction of the nerve fiber layers. As the edema becomes more marked the retina becomes fluffy, grayish in color, semiopaque, and tends to cover or envelope the retinal vessels. In the presence of retinal edema it is difficult to judge the degree of arteriole constriction.

The appearance of hemorrhages and exudates in the retina completes the picture of retinopathy. Some still prefer the name retinitis, and others prefer to call it retinosis. The hemorrhages are usually in the posterior one-third of the fundus, and as a rule, appear flame-shaped, indicating that they are in the superficial nerve fiber layer. The exudates have a similar distribution, and vary in size from that of a pinhead to half the area of the disc.

The recently formed superficial exudates, that is, those exudates in front of the retinal vessels, are whitish, fluffy, and have hazy margins. After these exudates have been present for a few days they become glistening white and the margins become more distinct. The exudates which form in the deeper layers of the retina, and possibly in the choroid, appear as indistinct grayish clouds. These changes in the retina usually disappear completely after the termination of the toxemia and subsequent improvement in the blood supply to the retina.

The earlier in pregnancy these toxic signs develop in the eyegrounds the more serious is the prognosis. If retinopathy appears before the twenty-eighth week there is only about 25 per cent chance of the patient giving birth to a live baby, even if the pregnancy be permitted to continue to the stage of viability. Wagener (*J. A. M. A.*, 101: 1380, 1933; *J. A. M. A.*, 103: 1910, 1934) reported similar findings, and quotes similar observations of Schiotz (*Klin. Monabstl. f. Augenh.* 67: 1-136, 1921) and Masters (*Tr. Am. Ophth. Soc.*, 31: 416, 1933).

#### DETACHMENT OF RETINA

An occasional patient during severe toxemia of pregnancy will develop detachment of the retina. The detachment is usually bilateral, and may or may not be accompanied by diffuse retinopathy. The detachment will usually become reattached spontaneously within 10 to 14 days after delivery. The portion of the retina that is detached is blind, but Benedict (in discussion on Kronfeld, *Arch. Ophth.*, 10: 646, 1933) reminds us as soon as it comes in contact again with the choroid it begins to see. Eight or ten years ago the author thought that retinal detachment occurred in approximately 2 per cent of hypertensive toxemia of pregnancy, but now he is convinced that this complication occurs much less frequently. Schiotz found seven instances of detachment in 158 eclampsias and threatened eclampsias. Detachment of the retina complicating toxemia of pregnancy has been reported by many other observers.

#### FREQUENCY OF EYEGROUND CHANGES

In a study of 300 consecutive patients suffering from hypertension during pregnancy it was found that the eyegrounds showed changes produced by the hypertension in 76 per cent of the cases. As shown in Table 1 there was an increase in the frequency of the eyeground changes when the cases were divided into groups according to the severity and duration of the hypertension. Class I included those patients whose blood pressure before delivery was below 150/100, in Class II was placed those patients whose blood pressure varied between 150/100 and 175/125, and Class III consisted of the patients whose blood pressure was 175/125 or more. Thus it is seen that eyeground changes were found in 41 per cent of Class I, in 84 per cent of Class II, and in 98 per cent of Class III. Since these surveys were made we have learned to give more attention to the presence of arteriole constriction, and to recognize even a single localized constriction. Now we find changes in the eyegrounds of approximately 100 per



cent of the women who have hypertension as high as 150/90 for two or three days or longer.

Among other findings, Table 1 shows that albuminuria is often absent even in severe toxemia, and that the phenolsulphonphthalein excretion test is of no value in this condition. But it will be noted that the frequency of 4-plus albuminuria, casts in the urine, and retinopathy occurs in proportion to the severity of the hypertension.

#### DIFFERENTIATION OF TYPES OF TOXEMIA

Interpretation of the eyeground changes often aids in differentiating the type of toxemia present. In pre-eclampsia and eclampsia the outstanding change is spastic localized and generalized constriction of the arterioles, and the degree

TABLE 1  
*Percentage of Tests Positive according to Severity of Hypertension*  
(From Hallum)

	CLASSES OF HYPERTENSION		
	I	II	III
Eyeground changes.....	41.0	84.0	98.0
Retinopathy.....	3.7	9.9	32.7
Albuminuria.....	46.0	63.0	68.0
4-plus albuminuria.....	3.3	9.2	26.0
Casts in urine.....	7.6	20.0	26.0
P. S. P. low output.....	43.8	41.8	45.2
N. P. N. retention.....	—	—	5.6
Abnormal weight gain (last trimester, 40 cases)...	—	—	7.5
First pregnancy.....	42.4	38.7	20.0
Sixth (or more) pregnancy.....	15.1	21.7	52.0
Average age.....	23.0	24.9	30.2
Labor induced.....	15.2	36.7	60.0

of constriction usually is found to be in proportion to the severity of the toxemia. When the angiospasm is severe retinopathy appears.

Such spastic changes are found most often in the last trimester of pregnancy, and are much more common in primiparas, especially young primiparas. This is because true toxemia occurs much more frequently in young women, especially during the first pregnancy. If the angiospasm did not exist long enough to cause organic changes in the walls of the arterioles throughout the body, within a few days after delivery the blood pressure returns to normal and remains so permanently, and the retinal arterioles soon resume their normal caliber. An increase in the uric acid content of blood above 3.5 per cent tends to indicate that the hypertension is of toxic origin, and peripheral resistance is actually produced by spasm of the arterioles. When the uric acid content of the blood is normal in a toxic patient who shows constriction of her retinal arterioles it is likely that vascular disease is the basis of the toxemia.

If the eyegrounds show only the signs characteristic of retinal arteriolar-sclerosis, as arteriovenous compression, unsymmetrical arteriole constrictions, increased light reflex, etc., the hypertension is explained by vascular disease that antedated the present pregnancy. Vascular disease accounts for most hypertension during the first two trimesters of pregnancy, and unless the hypertension is severe there are usually no toxic symptoms or positive laboratory findings. However, the hypertension of chronic vascular disease usually becomes accentuated during pregnancy.

Occasionally angiospasm is superimposed upon an eyeground that shows changes characteristic of chronic vascular disease, indicating that pre-eclamptic toxemia is superimposed on chronic vascular disease. Such an ocular fundus will show arteriolar constrictions, localized and generalized, out of proportion to the evidence of vascular disease. It is usually impossible on a single examination to be positive of such a combination of changes, but if subsequent examinations reveal a decrease in the arteriolar constriction it is proof of the presence of angiospasm.

The paper concludes with an extensive review of the literature.

(This article has been abstracted at great length for a number of reasons. In the first place, it makes available in unusually lucid form complete, detailed and practical instructions for the examination and interpretation of retinal changes in the toxemias. In the second place, it is written by an ophthalmologist specifically for obstetricians. Indeed, Dr. Hallum believes firmly, as stressed in the abstract, that retinal study will yield its greatest value in the toxemias if carried out by the obstetrician because he is in the preferable position to correlate the retinal changes from day to day with the general clinical course. Finally, the paper appeared in a publication which is rarely seen by obstetricians.

This article should serve as a stimulus to obstetricians everywhere, especially the house-staff group, to acquaint and drill themselves in retinoscopy. It is true that they may never become as completely competent as the ophthalmologist and may occasionally need to call the latter in for consultation. Nevertheless, between the opinion of an ophthalmologist who only infrequently sees a case of toxemia and an obstetrician who has been studying day in and day out the retinas of normal and hypertensive gravidæ, the opinion of the latter should be the more valuable.—Ed.)

## HYPERTENSIVE ENCEPHALOPATHY

### EDITORIAL

Prensa méd. argent., 33: 1000-1003, 1946

In the hypertensive form of Bright's disease, various cerebral manifestations may appear which are not due to renal insufficiency, cerebral hemorrhage or thrombosis. The most common symptoms are: (1) headache, sometimes severe and radiating to the back of the neck and causing rigidity suggesting meningitis or subarachnoid hemorrhage; (2) vomiting, of the cerebral type; and (3) convulsions or coma, or both in conjunction. Occasionally amaurosis is observed; ophthal-

moscopic examination fails to reveal changes, other than arterial constriction, which is frequently found. If the patient survives, vision returns to normal. Less frequently aphasia, hemiplegia and general disturbances appear. In essential hypertension these symptoms appear only during the malignant phase, although the focal cerebral symptoms may occur at any stage.

Formerly the manifestations were thought to be uremic, but it has been found that they occur even in the presence of normal renal function and without changes in blood chemistry. However, they are associated with arterial hypertension (hypertensive encephalopathy). Should uremia and hypertensive encephalopathy occur together, the convulsions are rarely of uremic origin. Hypertension of the cerebrospinal fluid and improvement following lumbar puncture are differentiating factors. In cases which are examined during a convulsive attack, and when the history is not known, the disease may be mistaken for other cerebral conditions, such as apoplexy, epilepsy, meningitis, tumor or cerebral abscess. If the symptoms last for a few minutes and then disappear, without sequelae, they may be attributed to hypertensive encephalopathy.

The previous history, the tension, urinary findings and eyegrounds differentiate between hypertensive encephalopathy and epilepsy. Meningitis and subarachnoid hemorrhage may be excluded by lumbar puncture. Severe edema of the papilla may accompany hypertensive encephalopathy, producing symptoms resembling those of cerebral tumor or hypertensive disease of the retina.

The importance of the treatment of hypertensive encephalopathy is stressed. In acute glomerulonephritis and eclampsia of pregnancy, in which the symptoms are similar, complete recovery frequently ensues if adequate treatment is given. If the early symptoms are recognized, it is usually possible to prevent the eclamptic attack. It must be remembered, in treating hypertensive encephalopathy, that the symptoms result from circulatory disturbances in the brain associated with hypertension, and not from renal insufficiency. Therefore, treatment is directed mainly toward improvement of the intracranial circulation and consists in venesection, lumbar puncture and intravenous injections of hypertonic solutions. Venesection is used in all cases of hypertensive encephalopathy, except in rare cases of marked anemia, and promptly relieves the convulsions. In the prodromal stage it may prevent the attack. There is difference of opinion as to the advisability of replacing the extracted blood with physiologic or glucose solution to dilute the toxins, since the introduction of the fluid may have an unfavorable effect on the high blood pressure and overburdened heart, and also increases the cerebral edema.

Lumbar puncture is of value in the treatment of hypertensive encephalopathy. If the pressure of the cerebrospinal fluid is not increased, a few cubic centimeters are removed; if there is hypertension, a sufficient amount is extracted to return the pressure to normal. The puncture should be carried out slowly, and if the pressure is extremely high, it should be reduced gradually by repeated punctures.

When the intracranial pressure is high, hypertonic glucose solutions may be injected to dehydrate the edematous brain and thus reduce the intracranial pressure. Hypertonic 50 per cent glucose solutions of dextrose rapidly reduce

the intracranial pressure, but an increase to the original level follows. This secondary increase may be avoided by using sucrose, which does not tend to permeate the cerebrospinal fluid and reduces the pressure for a prolonged period. The adult dose is 200 cc. of a 50 per cent solution, repeated, if necessary, in the amount of 100 cc. during the following 24 hours.

Another valuable therapeutic agent in hypertensive encephalopathy is magnesium sulfate, which may be given during the stage of headache and vomiting to prevent convulsions. It may be given orally, if possible, or rectally and, after the onset of coma or convulsions, it may be injected intravenously or intramuscularly. The effect of magnesium sulfate upon the convulsions, cerebral symptoms and blood pressure may be excellent, although the drug sometimes fails to arrest the convulsions. The favorable action of magnesium sulfate is not due entirely to the dehydrating effect on the brain, inasmuch as it may also be effective in hypertonic solution or in relatively small intramuscular doses.

Morphine should be given immediately, since it is of great value as a sedative. Intravenous sodium amytal may promptly inhibit the convulsions, especially in eclampsia of pregnancy, but it should be given with caution in hypertensive cases. If the convulsions do not respond to these measures, chloroform may be given in small doses. After cessation of these symptoms, the patient should be kept absolutely quiet in a dark room. Chloral hydrate may be given rectally. Caffeine and other circulatory stimulants have sometimes been used in cases of sudden collapse. Occasionally the clinical picture of cerebral edema due to hypertension is similar to that of cerebral tumor. In such cases prolonged improvement has followed a decompressive operation.

(This editorial has been abstracted by way of recalling that a convulsive disorder is known to occur in men and in non-pregnant women which is extremely similar if not identical to eclampsia. Not only the above editorial but also Fishberg, in his well known book, "Hypertension and Nephritis," (Lea & Febiger, Philadelphia, 1940) stresses this similarity. The latter author discusses hypertensive encephalopathy in part as follows:

"In the hypertensive forms of Bright's disease, various cerebral phenomena may occur, which are due neither to renal insufficiency nor to cerebral hemorrhage or thrombosis. The symptoms in question are most often headache, vomiting, convulsions and coma either individually or in combination; less often there is amaurosis, aphasia, hemiplegia or other evidence of focal or diffuse disturbance in the brain. . . . These episodes were formerly considered as uremic in nature and termed "acute uremia." However, recent investigations, particularly those of Volhard, have shown that the attacks may occur when kidney function is intact and the blood chemistry normal. The hypothesis of uremic origin is, therefore, untenable, and the term acute uremia misleading. As will be pointed out in the section on pathogenesis, this cerebral symptom-complex is correlated with arterial hypertension and for this reason has been termed *hypertensive encephalopathy* by Oppenheimer and the author. We shall first consider the clinical picture.

"The classical form of hypertensive encephalopathy closely resembles an epileptic seizure, consisting of prodromes followed by tonic and clonic convulsions, with coma continuing after the convulsions. The prodromes are usually, though not always, present. Headache, vomiting and increased apathy or somnolence are the most common. . . . During this period the blood pressure usually rises, an important symptom which will be discussed further below. The urinary volume is often, though not invariably, diminished for a varying period before a seizure. Following any of the above prodromes, or out of a clear

sky, the convulsions start. . . . A severe attack usually starts with a tonic spasm, the body being thrown into opisthotonus, the eyes completely or half shut, the limbs rigidly extended, the fists clenched. During the tonic stage involvement of the diaphragm, as a rule, leads to cessation of respiration with consequent cyanosis, while the impediment to the venous return causes the veins in the neck to swell mightily. The whole produces a terrifying picture of impending asphyxia which is finally relieved by gasping respirations when the tonic spasm gives way to the clonic stage. At times, instead of starting with a tonic convulsion, the fit is initiated by twitching of the face, on which follow directly the clonic convulsions. The clonic spasms may start in the arm, face or some other muscle group, and then generalize rapidly. They may be wildly irregular, the patient throwing himself about the bed or off it. . . .

"The patients often foam at the mouth; the similarity to epilepsy may be increased by biting the tongue with bloody foam, though this is unusual. As a rule, but not always, the temperature is found elevated when measured as soon after the fit as feasible. . . . The convulsions may last from a few seconds to ten or more minutes. As a rule, there is more than one convulsion and over two hundred within a day have been observed. . . . If repeated fits occur, the patient usually remains comatose in the intervals. The coma persists for a varying period after the convulsions have stopped. Coma may occur in the absence of all convulsions as a manifestation of hypertensive encephalopathy. After awakening, the patient may feel comparatively well; there is usually complete amnesia for what has happened. . . .

"The blood pressure is practically always found elevated, and the elevation is usually extreme. Preceding the onset of the convulsions there is mostly an additional rise in the already high arterial pressure, which may elevate the arterial tension to extreme heights. The hypertension is a most important diagnostic aid. The rapid rise in blood pressure, together with the strain thrown on the circulation by the convulsions, may cause acute myocardial insufficiency with secondary fall in blood pressure and rapid death from circulatory failure. . . .

"There are no known changes in blood chemistry characteristic of hypertensive encephalopathy. . . . The fact that there is no direct correlation between retention of urinary constituents and hypertensive encephalopathy cannot be too strongly emphasized. . . .

"The same cerebral syndrome may . . . occur in the four etiologically distinct conditions of diffuse glomerulonephritis, essential hypertension, eclampsia gravidarum and lead poisoning. The cause of the cerebral symptoms common to these four conditions, cannot be renal insufficiency, for this is often, in fact most often absent in each. The explanation of the cerebral syndrome must be sought in the one phenomenon common to all four states and present before the onset of the cerebral symptoms, namely, arterial hypertension.

"The problem thus becomes that of the connection between the hypertension and the cerebral symptoms here gathered together under the generic designation of hypertensive encephalopathy. Anatomical observations show that the hypertension does not produce the cerebral symptoms through the intermediacy of such gross lesions as cerebral hemorrhage or thrombosis. The character of the symptoms, as well as their usually sudden appearance and disappearance, immediately suggest that they may be manifestations of focal or generalized cerebral ischemia due to circulatory disturbances in the brain. . . ."

\* \* \* \* \*

It is usually taught that eclampsia is a disease peculiar to pregnancy, but as may be seen from the above abstract and quotation, this is not strictly true because a seemingly identical clinical picture develops sometimes in men, children and non-pregnant women. Just what bearing this has on the etiology of eclampsia, it is difficult to say, but the following rather obvious generalizations might be pertinent: (1) the common denominator is hypertension, a fact reminding us that eclampsia is not a disease of the liver, or of the kidney, or of any other particular organ, but of the arterial system; (2) students of the cause of eclampsia would do well to take on as collaborators experts in the general field of hypertension; and conversely, students of hypertension in general might learn much—as well as contribute much—by studying eclampsia.—Ed.)

HIGH PROTEIN, LOW CALORIC DIET FOR THE PREVENTION  
OF TOXEMIA OF PREGNANCY

RALPH LUIKART

Am. J. Obst. &amp; Gynec., 52: 428-434, 1946

This paper is based on the records of 1366 obstetric patients, of whom 1000 when first seen were within normal weight range and organically sound. They revealed an initial blood pressure within normal limits and cooperated in a controlled diet regime. The success of this dietary regime depends upon the patient's understanding the purpose of the program and upon her cooperation.

The prenatal care in this program did not differ markedly from the general trend, except for the controlled diet and frequent observation of the condition of the patient's blood. The objective was a restriction of total weight gain to 16 pounds or less during pregnancy and a maximum gain of 2 pounds in any one month, without interfering with adequate nutrition. The dietary regime included a high protein intake. According to Leverton and McMillan, women receiving an augmented intake of protein from 4 months before delivery to 3 months after delivery had higher hemoglobin and red cell volumes, less edema and more successful lactation than women receiving no supplement.

In slightly more than a third of the patients there was a trace of albumin in an uncatheterized urine specimen sometime during pregnancy. There were no cases of puerperal infection, but 2 patients had mild phlebitis. In these 1000 patients whose weight was controlled by a restricted diet, none developed toxemia, pre-eclampsia or eclampsia. There were no maternal deaths. There were no large babies. The fetal mortality rate in the series of 1000 patients was one-sixth the fetal mortality in the 366 cases in the uncontrolled group.

VERATRUM VIRIDE IN THE TREATMENT OF THE TOXEMIAS OF  
PREGNANCY

J. ROBERT WILLSON

Am. J. Obst. &amp; Gynec., 52: 273-283, 1946

In this paper the results are reported of the treatment of a group of patients with hypertensive toxemias of pregnancy by *veratrum viride* alone. The blood pressure and pulse rates in the pre-eclamptic patients were consistently reduced, but apparently to the detriment of adequate renal function, an undesirable consequence in these patients.

A total of 12 patients was studied. Nine of these were not in labor, and the duration of their pregnancies varied from 32 to 37 weeks; 8 were primigravidas and all but one had pre-eclampsia. Three patients were in labor. Blood pressure, pulse rate, fluid intake and urine output were determined at regular in-

tervals. The initial injection of veratrone (an aqueous solution of *veratrum viride*) was usually 0.5 cc., and subsequent injections varied from 0.25 to 0.5 cc.

In the prenatal patients the blood pressure was substantially reduced in each instance, the pressure being kept below the preinjection level for periods varying from 6 to 22 hours, when the observations were terminated. The reduction of blood pressure was somewhat less striking in those patients who were in labor. The highest average pulse rate in the prenatal patients following administration of the drug was 73 per minute, and the lowest pulse rate recorded was 44 per minute. The pulse rate remained higher in the patients in labor than in the prenatal cases. In all patients not in labor, the injection of the drug was followed by a reduction in urine volume; in 4 patients the urine output reached a dangerously low level. The urine volume in those patients in labor was not significantly altered by the drug; however, in one there occurred a marked reduction. There were no ill effects in the babies, no interference with labor, and no instances of circulatory collapse.

The author points out that it is more important to maintain adequate urine production in pre-eclampsia or eclampsia than it is to control the hypertension, the reduction of blood pressure being necessary usually only if it reaches a dangerously high level. Reduction of blood pressure even to normal levels in these conditions may result in definite depression of renal function. *Veratrum viride* meets the requirements for the treatment of toxemia only in that it will reduce the blood pressure. It is concluded that the beneficial results in series of patients treated with *veratrum viride* can be duplicated in series in which the drug was not used. 4 figures.

## CEREBROVASCULAR COMPLICATIONS OF PREGNANCY

WILLIAM C. ELLER

Am. J. Obst. & Gynec., 52: 488-491, 1946

The author draws attention to the cerebrovascular complications of pregnancy for the following reasons: (1) they are frequently associated with toxemia of pregnancy; (2) they greatly increase the mortality rate, brain hemorrhage ranking as the second most common cause of death in eclampsia; (3) areas of softening or encephalomalacia may produce death in the absence of hemorrhage and are commonly unrecognized; and (4) there is evidence indicating that patients with vascular damage sufficient to produce fatal hemorrhage or softening should not always be diagnosed as eclamptics. Three case reports, briefly summarized below, illustrate these points.

Case I. Patient, aged 36 years, gravida ix, para vi, admitted in labor. Blood pressure 195/92; temperature 99.4 degrees F., moderate ankle edema; urine contained a trace of albumin, a few red blood cells and no casts. Obstetric course was characterized by uterine inertia. In ensuing 21 hours patient re-

ceived 2000 cc. of 5 per cent dextrose. Later in day catheterized urine showed trace of albumin and was loaded with hemolyzed red cells. Blood pressure remained elevated. Twenty-one hours after admission temperature rose to 102 degrees F., and patient was given 1000 cc. of 5 per cent dextrose by hypodermoclysis. Temperature later rose to 104.4 degrees F., pulmonary edema developed, patient became comatose, temperature rose to 110 degrees F., and death occurred about 31 hours after admission. Postmortem findings included generalized slight arteriosclerosis, medial necrosis of thoracic aorta, perivascular hemorrhage throughout brain, and an area 2 cm. in diameter of encephalomalacia in hypothalamus.

Case II. Patient, a 20 year old primigravida, admitted in labor. Blood pressure 220/156; marked leg and ankle edema; catheterized urine showed large amounts of albumin, occasional red cells and granular casts. Blood chemistry showed slight elevation of uric acid levels, normal creatinin and reduced serum albumin levels. Patient delivered spontaneously and blood pressure fell, but subsequently rose to 220/150 (17 hours post partum). Patient suffered a 2-minute convulsion, followed by coma and Cheyne-Stokes respirations. Temperature was 105 degrees F. In next 12 hours temperature and blood pressure fell, but evidence of left hemiplegia and right oculomotor paralysis developed. Spinal fluid under pressure of 152 mm. of water and contained 188 red blood cells per cubic mm. and 224 mg. per cent of protein. Blood pressure rose, temperature rose to 107.6 degrees F., and patient expired 92 hours post partum. Postmortem examination revealed large area of hemorrhage and encephalomalacia in right midbrain, and very little evidence of chronic arteriolar or renal disease.

Case III. Patient, aged 39 years, gravida i, para i, admitted in comatose state. Had previously been treated for "stroke" and high blood pressure. On admission blood pressure was 246/130; reflexes hyperactive but equal; no edema; catheterized urine contained large amounts of albumin and occasional red cells. Spinal fluid, under pressure of 220 mm. of water, contained 100 mg. per cent of protein. Subsequently this pressure rose with appearances of gross blood. Reflexes disappeared, temperature rose to 109 degrees F., and patient expired 28 hours after admission. Postmortem findings included generalized arteriosclerosis, nephrosclerosis and cardiac hypertrophy. There was an area of recent hemorrhage, 3 cm. in diameter, in midbrain, with surrounding encephalomalacia. This patient, whose findings so closely resembled those of the other 2 patients, was not pregnant.

These cerebrovascular complications may manifest themselves as hemorrhage or encephalomalacia, usually depend on some pre-existing vascular lesion not peculiar to pregnancy, and therefore are not to be classified among the true toxemias. In the absence of chronic vascular disease, the author suggests that temporary vasospasm may result in distal softening with or without hemorrhage. Careful neurologic examination of the hypertensive pregnant patient is necessary to discover these complications and institute adequate treatment, which may improve the generally unfavorable prognosis. 1 figure.



## ABDOMINAL TYPE OF ECTOPIC PREGNANCY

CHARLES BATE

Am. J. Surg., 72: 258-261, 1946

In most instances extra-uterine pregnancy results from the nidation of a fertilized ovum in some portion of the mucosal lining of the Fallopian tube. It has been claimed that nidation can take place only in Müllerian tissue, but Studiford maintains that primary peritoneal pregnancy may occur. The author believes that the first of the following 2 cases was probably one of primary peritoneal pregnancy.

Case I. The patient, aged 37 years, para 6, consulted the author with complaints of cramping pains in her right side and chills and fever of 3 days' duration. Her pulse was 110, temperature 102 degrees F., respirations 24, blood pressure 110/70 and hemoglobin 14 Gm. Four months previously she had missed one menstrual period, but since then had menstruated one or 2 days at her regular period time. Pelvic examination revealed a soft mass, the size of a grapefruit, situated to the right of a small firm uterus. She was hospitalized and given 2000 cc. of 10 per cent intravenous glucose daily and 1 Gm. of sulfadiazine every 4 hours.

On the third day her temperature was normal and the abdomen was opened under spinal anesthesia. A 4 months' fetus lay in the peritoneal cavity with the placenta attached to the omentum and intestines. There was no evidence of recent or remote injury to the tubes, nor of uteroperitoneal fistula. Fetus and placenta were completely removed, 10 Gm. of sulfanilamide crystals were placed in the abdominal cavity and the abdomen was closed without drainage. Recovery ensued.

Case II. A 26 year old para 0, gravida i, was admitted with the complaint of a painful mass in her lower abdomen. Her last menstrual period had occurred 5 months previously. The blood pressure was 90/60, pulse 120, temperature 102 degrees F., hemoglobin 9.5 Gm., red cell count 3,200,000 and total white cell count 12,000. She was transfused with 500 cc. of whole blood, and under spinal anesthesia laparotomy was performed. The peritoneal cavity was filled with fluid and clotted blood. The right tube was inflamed and fastened to the back of the uterus. The uterus was in normal position and not enlarged. A placenta was firmly attached to the posterior aspect of the broad ligament and a 3 months' fetus lay free in the abdominal cavity. The placenta and fetus were removed, 10 Gm. of sulfanilamide crystals were placed in the abdominal cavity and the abdomen was closed without drainage. The patient recovered.

The necrotic placental tissue was found to be inserted in the wall of the fimbriated end of the tube and the Fallopian tubes showed a severe purulent chronic salpingitis. 5 figures.

## BILATERAL SIMULTANEOUS TUBAL PREGNANCY

C. M. HARRIS AND L. R. LEVITON

Am. J. Obst. &amp; Gynec., 52: 492-494, 1946

A total of 84 cases of simultaneous pregnancy in both tubes has been reported; 8 of these have been reported since 1939. The growing list of cases emphasizes the importance of exploring both adnexal regions at operations. Most workers agree that the treatment of choice is partial bilateral salpingectomy, with preservation of one or both ovaries and uterus.

The authors present the case of a 33 year old Negress who was admitted to the hospital one hour after the onset of severe pains in the left lower abdomen, following which she fainted. There was no history of pelvic inflammatory disease. The menses had been regular except for the last 2 months, when they had been scanty and lasted only 2 or 3 days. The patient had noticed spotting for the last 2 months and for the last 2 weeks had had intermittent cramping lower abdominal pain.

The temperature was 97.2 degrees F., pulse 90, respirations 22 and blood pressure 105/70. The abdomen was distended with marked generalized tenderness and rigidity of both lower quadrants. The uterus was slightly enlarged and soft, and there was a tender cystic mass in the left fornix.

Following transfusion with whole blood, a laparotomy was performed. A cystic mass, containing clotted blood, distended the distal third of the left tube and adhered to the left ovary. The mass, distal half of the tube and the ovary were removed. A similar mass distended the middle third of the right tube, and this was removed by partial salpingectomy. The free blood was sponged from the abdomen before closure, and the patient recovered.

No fetal parts or membranes were found grossly in either specimen. 2 figures.

FULL-TIME SECONDARY ABDOMINAL PREGNANCY  
WITH DELIVERY OF LIVING CHILD

H. S. WATERS

J. Obst. &amp; Gynaec. Brit. Emp., 53: 285-288, 1946

A Hindu woman, aged 28, was admitted to the hospital because of slight pelvic contraction and nonengagement of the fetal head, in spite of the fact that she was a primipara at term. Her pelvic measurements were not unusual for her race. The fetal head could be felt below the umbilicus with the fetal heart audible to the left of the umbilicus.

Two months later she began to have labor pains, and examination revealed a tender abdomen with fetal head still above pelvic brim. She was admitted one

finger; membranes or fetal parts were not felt. Strong pains continued without engagement of the head or cervical dilatation. The presenting part could not be felt *per vaginam* and fluid was not being passed. A diagnosis was made of malpresentation due to soft tissue tumor or twin preventing engagement.

A sub-umbilical incision was made with the intention of performing a lower segment cesarean section. On opening the abdomen the child was seen completely covered with the membranes and lying in the first vertex position entirely outside the uterine cavity. The placenta was made out through the membranes, attached to the posterior wall of the uterus in the region of the fundus and right cornu. The right Fallopian tube, round ligament and ovarian ligament entered the gestation sac here, widely separated from one another. On the left side the 3 structures were inserted into the left cornu of the uterus. The membranes were incised and a living, perfectly-formed child was delivered. The placenta was then seen intimately fused with the structures in the region of the right uterine cornu. The uterus, right tube, ovary, placenta and membranes were removed. The patient recovered and was discharged on the 18th day. It was elicited after operation that she had felt faint and fallen to the ground when about 4 months pregnant, and that she had experienced occasional abdominal pain. There had been no vomiting or vaginal bleeding.

Histologically, no uterine muscle could be found in the region of the right tubal insertion. Here it had been entirely replaced by chorionic villi and blood sinuses of the placenta.

The chief interest of this case lies in its rarity, Wilson having reported only 40 recorded cases of delivery of an abdominal pregnancy at term (up to 1935), and of these only 20 children were born alive. Apart from its rarity this case is of interest for the situation of the rupture, which is assumed to have taken place in the interstitial portion of the tube at about the 4th month. Although this type of rupture is said to be followed by very profuse bleeding, only a little pink fluid was found at operation, and not many adhesions. It would seem that the rupture occurred very gradually through the upper part of the tube where the chorion laeve happened to be situated, so that the big placental sinuses were not affected. 1 figure.

### SICKLE-CELL ANEMIA IN PREGNANCY; REPORT OF A CASE WITH AUTOPSY

R. W. NOYES

Am. J. Obst. & Gynec., 52: 469-473, 1946

A 32 year old multiparous Negro woman was admitted to the hospital complaining chiefly of headache and swelling of the ankles. Pregnancy had been diagnosed 2 months previously but she could not remember the date of her last menstrual period. One month prior to entry she began to notice dyspnea,

palpitation, orthopnea, cough, and swelling of ankles, fingers and eyelids. She had had headaches, dimness of vision and episodes of lower abdominal pain and vomiting.

On entry her temperature was 98.8 degrees F., pulse 100, respirations 34 and blood pressure 170/100. Her face and extremities showed marked pitting edema. The eyegrounds showed moderate "silver wire" changes and some arteriovenous nicking. Examination of the heart revealed a systolic thrill and murmur at the apex. The fundus rose to 3 finger-breadths above the umbilicus and the fetal heart was audible. The spleen was palpable. A small volume of dark brown urine was obtained by catheter which showed a specific gravity of 1.008, pH 6.0, albumin 4.5 Gm. per liter. Centrifuged sediment showed occasional leucocytes and rare red cells, but was loaded with granular, hyalin and cellular casts, and motile rods.

Blood study revealed the following pertinent data: hemoglobin 5.5 Gm., red cell count 3.2 million, white cell count 29,100 with normal differential, marked anisocytosis and poikilocytosis, sickle cells 70 per cent (standing 24 hours), color index .59, mean corpuscular hemoglobin 15.6 mm., mean corpuscular hemoglobin concentration 26.2 per cent, mean corpuscular volume 65.5 c. mm., and icterus index 10.

The clinical diagnosis was pregnancy of 7 months' duration, severe pre-eclampsia and sickle-cell anemia. The patient was placed on a salt-free, high protein diet with fluids not restricted and sedation as indicated. She was given intravenous 20 per cent glucose slowly, and continuous nasal oxygen. Slow transfusions of blood and plasma were given. When she failed to respond to conservative therapy, it was decided to deliver her on her fifth hospital day. Rupture of the membranes and insertion of a Voorhees bag was carried out. One and one-half hours after insertion of the bag, without apparent reason, the respirations became irregular and ceased. The blood pressure 45 minutes before death was 120/90, pulses 110, respirations 30. The fetal heart sounds were inaudible at death.

At autopsy both pleural cavities contained 1000 cc. of fluid and the lungs were partially atelectatic. The right ventricle was dilated and the heart and large vessels were filled with a solid red fibrous clot. The liver was enlarged, but normal in appearance, and the spleen was greatly enlarged. Microscopically, tissues showed markedly congested capillaries, the masses of red corpuscles showing frequent sickle cells. There was moderate tubular degeneration in the kidneys with albuminous exudate into the lumen. The spleen contained a very few small Malpighian corpuscles, and the entire parenchyma was composed of red blood cells which had apparently ruptured the sinusoids. The diagnosis was sickle-cell anemia with right-sided heart failure, pleural effusion and visceral congestion. A clinical diagnosis of pre-eclampsia was added, though characteristic pathology was absent.

Two unusual features in this case were the age (the only older previously reported case during pregnancy was 35 years old) and moderate obesity of the patient (usually these patients are thin and underdeveloped). The author

concludes that sickle-cell anemia is a rare but rather consistently fatal complication of pregnancy, the diagnosis of which usually is not made. Obstetricians practicing among Negroes should be familiar with its clinical picture, and be prepared for increased tendency for thrombosis and liability to fatal sepsis. 1 figure.

(Although sickle-cell anemia is a grave complication of gestation, Noyes is perhaps unduly pessimistic when he concludes that it is a "rather consistently fatal complication of pregnancy." According to the cases reported in the literature—few in number, it is true—the maternal mortality is about 30 per cent. We see a case of true sickle-cell anemia—not just the trait—every two or three years and believe that multiple blood transfusions begun early in pregnancy and repeated as often as necessary to maintain the hemoglobin near 10.0 grams will reduce substantially the present high mortality. The number of transfusions required may run as high as 20 or more in the course of pregnancy.

Noyes' case was an exceptionally desperate one for 2 reasons: first, the patient did not come under his care until the 7th month when she had reached dire straits; and second, she presented a fulminating degree of pre-eclampsia in addition to the anemia,—a fact not sufficiently emphasized in the above abstract.—Ed.)

## A CASE OF APLASTIC ANAEMIA IN PREGNANCY

MARY A. M. BIGBY AND F. A. JONES

J. Obst. & Gynaec. Brit. Emp., 53: 182-184, 1946

The case history presented in this paper records a temporary acute aplastic anemia occurring late in pregnancy, with recovery after delivery.

A 36 year old patient had a past obstetric history of 4 normal pregnancies. The fifth pregnancy (twins) was complicated by hyperemesis gravidarum and anemia, and the patient had a severe secondary postpartum hemorrhage.

She was first seen at the 14th week of her sixth pregnancy with hemoglobin 73 per cent, red cells 4,380,000 and color index 0.83. When next seen at this hospital at the 35th week, she had had swelling of the legs for 4 weeks and diarrhea and vomiting for 2 weeks. She had gross edema of the feet and a blood pressure of 120/70. The urine was normal; liver and spleen were not palpable. The blood picture was hemoglobin 39 per cent, red cells 2,350,000 and color index 0.82. Anisocytosis and hyperchromic cells were present. Blood transfusion raised the hemoglobin to 44 per cent; but at the end of one week the blood count had fallen to hemoglobin 33 per cent, red cells 1,840,000, color index 0.91, white cells 1000 (polymorphs 40 per cent, lymphocytes 56 per cent, monocytes 4 per cent) and platelets 65,000. Sternal puncture showed great reduction of nucleated cells. Myelocytes were mostly degenerated but there was an excess of eosinophils. Some giant platelets were seen. The myelogram excluded a megaloblastic anemia of pregnancy and indicated an aplastic process. Transfusions within the next 4 days raised the hemoglobin to 85 per cent. At this time she had bleeding from the gums and purpuric spots on the arms, and

within the next 3 days she had epistaxis, melena and gross hematuria. She was given Hepalon, iron, ascorbic acid and yeast and 2 further transfusions prior to induction of labor by high rupture of the membranes. A healthy baby was delivered, following which she had a severe postpartum hemorrhage and was given 2100 cc. of blood. Hematuria persisted for a few days. She had infection of the urine, excessive lochia and pyrexia up to 100.6 degrees F., but her general condition was greatly improved. Following a secondary hemorrhage 2 weeks after delivery the uterus was explored and a placental polyp was removed. She was transfused and made a good recovery. By the 13th week the hemoglobin was 98 per cent and the red cells 5,000,000. Sterilization was performed 6 months later and the patient has remained well.

Careful questioning was made concerning exposure to potentially toxic substances, but none could be found. The present case confirms the beneficial effects of termination of pregnancy in the presence of this complication.

## CHORIONEPITHELIOMA IN AN 18-YEAR-OLD PRIMIGRAVIDA

J. R. DURBURG

Am. J. Obst. & Gynec., 52: 484-487, 1946

The case presented in this paper is unusual in that 18 years is an extremely young age for this type of tumor to occur, and in that well over 80 per cent of chorionepitheliomas occur in multiparas.

An 18 year old primigravida was first seen on Sept. 14, 1945. The history obtained from her private physician revealed that her last menstrual period had occurred in Nov., 1944. In Feb., 1945, she was diagnosed as having a threatened abortion. In April, 1945, she passed grape-like clusters, identified as hydatidiform mole; a curettement revealed no evidence of malignancy. The patient had normal menses in June and July, but in August she had copious vaginal bleeding. Nothing notable was found on pelvic examination. Five transfusions were given and an Aschheim-Zondek test was made which was strongly positive. Hysterectomy was advised.

At the present admission the uterus was soft and the size of a 6 weeks' pregnancy, the hemoglobin was 50 per cent and the red cell count 3,000,000. A chest x-ray for metastases was negative as was a thorough medical examination. The Friedman test was weakly positive. The patient had a copious hemorrhage of about 1500 cc., which was replaced. A diagnostic curettage yielded about 0.5 Gm. of tissue which was reported to be placental tissue with no evidence of malignancy. She was discharged with instructions to return in 10 days for a repeat Friedman test.

A few days later she had another vaginal hemorrhage and was rehospitalized. Her blood level was brought to normal and 2 separately run Friedman tests

were reported negative. A curettement revealed only a small fibrin blood clot. An abdominal hysterectomy was performed, and no evidence was found of metastases in the pelvic or abdominal cavity. Three months postoperatively a Friedman test was negative and the patient was apparently on the road to permanent recovery.

Pathologically, the posterior and superior aspects of the vault of the uterus contained a coarsely granular, dark red mass, about 5.5 cm. in diameter. The tumor mass seemed confined to the myometrium. Microscopically, the mass consisted of edematous connective tissue infiltrated with round cells, trophoblasts and red cells which formed island cords. Both syncytial and Langhans cells were identified with the myometrium, showing numerous mitoses and amitoses in the darkly stained nuclei. The diagnosis was chorionepithelioma with pro-gestational uterine hypertrophy.

Marked hemorrhages are typical of this tumor, and the present case illustrates the fact, since in excess of 14,500 cc. of blood was transfused. On 9 occasions the patient had a temperature of 104 to 105 degrees F., following marked hemorrhage. Penicillin and sulfadiazine appeared to have little effect on the course of the fever, and it was decided that it was due to necrosis of the tumor. It is believed that the negative Friedman tests in this case were due to thrombosis of the maternal vessels, preventing escape of the trophoblast into the blood stream. The diagnostic curettages performed in this case were of no value in making the diagnosis, since the tumor was embedded in the myometrium, leaving the endometrial surface glistening and smooth. 3 figures.

(Information about the age incidence of chorionepithelioma is not readily available but the old notion that this disease is decidedly more common in older women may be erroneous. It so happens that of the last 5 cases of chorionepithelioma which have come to my attention in Baltimore, 2 occurred in 17 year old girls.—Ed.)

## PULMONARY TUBERCULOSIS AND PREGNANCY

A. L. JACOBS

J. Obst. & Gynaec. Brit. Emp., 53: 368-376, 1946

The three main aspects of this problem which are considered in the literature are: (1) Does pregnancy tend to aggravate active disease or to reactivate quiescent disease in the lung? (2) To what extent may tuberculous women be permitted to have children? (3) Is tuberculosis an indication for abortion? Much of the literature has served to obscure rather than to clarify these points. The balance of opinion appears to hold that pregnancy is harmful to the tuberculosis, although today there is a tendency to consider the individual case apart from this generalization.

The author surveys a few representative publications. Rist, in a study of more than 170 cases of pregnancy associated with phthisis, found that more

than 80 per cent were worse after the pregnancy and more than 50 per cent were dead within 2 years of it. However, adequate consideration is not given to the nature, severity and extent of the tuberculosis, nor is there control material of cases of equal severity uncomplicated by pregnancy. Many authors supporting the same view are open to the same criticism. Forssner found very little difference in the less advanced cases of phthisis after pregnancy as compared with a control series. However, in the more advanced cases there appeared to be a somewhat less favorable outcome for the women who had undergone pregnancy.

As to the manner in which pregnancy may exert a harmful effect on tuberculosis, most stress has been laid on mechanical factors: the enlargement of the uterus and the consequent progressive rise of the diaphragm during pregnancy. The restriction of movement of the diaphragm was formerly thought to be detrimental, but more recently this was seen to conflict with the theory of collapse therapy. At present it is held that elevation of the diaphragm during pregnancy is favorable, but that the sudden descent during labor is harmful. This is thought to explain improvement of lung disease during pregnancy followed by rapid regression after delivery. The author stresses that the factor of great importance ignored by many writers is the influence of social and environmental conditions; that is, the drastic changes and increased burdens which the advent of an infant brings to the woman.

The few studies which exist on therapeutic abortion in tuberculosis have failed to show that an artificially interrupted pregnancy has, in general, any less favorable effect on the course of the lung disease than a full time pregnancy. Even those who advocate therapeutic abortion are agreed that it must be performed within 3 to 4 months of conception. As regards the child, congenital tuberculosis is very rare, and provided the infant is protected from infection after birth, its chances for normal development are good.

It is difficult to assess the incidence of tuberculosis associated with pregnancy, and if cases are not to be missed in routine antenatal examination, some form of radiological examination is necessary. In a series of 4430 pregnant women screened at Paddington Hospital, there were 68 cases of tuberculosis, or 1.53 per cent. Of these 68 cases, 0.61 per cent were active, 0.25 per cent were possibly active and 0.67 per cent were probably inactive.

The management of the pregnant tuberculous patient may be summarized as follows:

1. Therapeutic abortion is of little help. In those cases where it may be indicated, it can be considered only in the first 3 to 4 months.
2. Pregnancy is an added indication for prompt application of all possible means of treatment, especially collapse therapy, on the usual indications. Treatment must be continued after labor.
3. Skilled obstetric care must be provided, preferably in the same institution where the tuberculosis is treated.
4. The infant usually must be separated from the mother at birth.
5. Domestic help and financial assistance in the home must be provided where necessary.



# PATHOLOGY OF LABOR AND PUERPERIUM

## DISCUSSION OF PLACENTA PREVIA

VARIOUS AUTHORS

Proc. Roy. Soc. Med., 39: 551, 1946

This abstract summarizes the remarks of a number of speakers at a special session on placenta previa of the Royal Society of Medicine (Section of Obstetrics and Gynecology,—Professor F. J. Browne, M.D., presiding).

Mr. C. H. G. Macafee, in opening the discussion, reported his more recent results with the expectant method of treating placenta previa,—his initial article having been reviewed just a year ago in the *Survey*, 1: 52, 1946. He now has had 191 cases, including 24 private cases, with but 1 maternal death (0.5 per cent) and with a total infant loss of but 42 (22 per cent). When the fetal mortality was corrected by the elimination of abnormalities such as anencephaly from the stillbirths and of gastroenteritis from the neonatal deaths, it was only 18.8 per cent.

In support of his opinion that there is a definite place for expectant treatment in this complication he submitted the following arguments:

(1) A severe initial hemorrhage rarely occurs apart from vaginal manipulations. The number of primigravidae, and indeed multiparae, who proceed to full term with extreme degree of placenta previa without hemorrhage is striking.

(2) Some patients have a sharp but not severe hemorrhage at 30 to 34 weeks. Later the placenta can be palpated inside the os without provoking further bleeding, this being due to infarction of the separated area.

(3) Repeated hemorrhages have occurred while in hospital without embarrassing mother or baby. Many patients carry out their own expectant treatment by ignoring small hemorrhages, until one occurs which alarms them.

The attitude that a placenta previa is not an obstetrical emergency which must receive active treatment at the first hemorrhage has meant that the infant's chance of survival is much enhanced. Approximately 42% of the stillbirths or neonatal deaths occurred in the first two years under review, whereas in 1944 there were only three such deaths (16.6%) and in the first nine months of 1945 one death (6.4%).

The decision regarding a vaginal examination demands the careful consideration of an experienced obstetrician. With few exceptions a vaginal examination has been performed on all cases in this series, but only after all preparations were complete for immediately carrying out the appropriate treatment for the individual case, therefore the examination has been postponed until the termination of expectant treatment and is then made with the patient on the operating table. The cervix and the vagina should, of course, be inspected per speculum after the first hemorrhage to exclude local causes of bleeding.

A vaginal examination is essential because:

(1) It is not possible to diagnose a placenta previa on the character of the bleeding.

(2) The diagnosis of placenta previa should not be made unless the placenta has been felt in the lower uterine segment.

(3) Only when the type of placenta previa is determined can one decide upon the best method of treatment.

Mr. Macafee treats placenta previa (usually after a waiting period to favor fetal survival) either by rupture of the membranes or by cesarean section. Low implantation of the placenta (Type I) is managed by rupture of the membranes; marginal placenta previa (Type II) is likewise treated provided the placenta is anterior, but if it is posterior, cesarean section is performed because with this location of the placenta the inferior strait is encroached upon by the thickness of the placenta and resultant difficulties are feared. Partial and complete placenta previas (Types III and IV) are handled by cesarean section.

Miss Josephine Barnes dealt with the subject of placenta previa in relation to the general problem of antepartum hemorrhage. Between the years 1927 and 1944 inclusive, 538 cases of antepartum hemorrhage were admitted to the, Obstetric Hospital, University College Hospital. The cases were classified into four groups as follows:

Total.....	538
Delivered elsewhere.....	21
(1) Placenta previa.....	140
(2) Accidental antepartum hemorrhage.....	73
(3) Antepartum hemorrhage of uncertain origin.....	285
(4) Antepartum hemorrhage from extraplacental lesions.....	19

No case is accepted as one of placenta previa unless the placenta is either felt from below with a finger passed through the cervix or is found to be in the lower segment at abdominal section. The appearance of the placenta after delivery and the clinical features of the case are not accepted as evidence of placenta previa.

Similarly, no case is defined as accidental antepartum hemorrhage unless the absence of the placenta from the lower segment is confirmed either by thorough digital exploration from below or at abdominal section. The occurrence of concealed hemorrhage, while denoting in most cases that the placenta is in the upper segment is not in itself diagnostic since concealed hemorrhage may occur in placenta previa.

The adoption of this strict classification has meant that more than half of her cases fall into the group of antepartum hemorrhage of uncertain origin, and the adoption of a more expectant attitude to cases of antepartum hemorrhage has led to an increased proportion of cases in this group.

Lesions of the cervix and vagina are diagnosed at the routine examination with a speculum, which is performed when the patient is admitted. It must

be emphasized that the presence of, say, a vascular erosion of the cervix does not necessarily exclude a more grave cause for the hemorrhage.

The general maternal mortality for the whole series was 2.7% and the uncorrected fetal mortality was 36.9%.

In the 140 cases of placenta previa, the maternal mortality was 2.9% and the fetal mortality 52.5%. More detailed analysis shows that out of the 71 infants lost, 38 were lost following the bringing down of a leg to check hemorrhage. The majority of these cases occurred early in the series and the method has largely been abandoned in recent years.

For the classification of cases of placenta previa she has used that originally suggested in 1929 by Mr. Norman White. This divides cases of placenta previa in accordance with the situation of the placenta into four types or degrees. It is suggested that this classification should be universally adopted. It is interesting to note that, so far, the best results have been obtained in cases of fourth degree placenta previa, largely due to the high incidence of cesarean section in the treatment of these cases.

In order to improve the results to mother and infant, certain general principles can be laid down. The first is avoidance of sepsis and the second, preparations to combat hemorrhage. This means that such cases should never be dealt with outside a properly equipped institution and that a patient suffering from antepartum hemorrhage should be transferred to hospital at once without any vaginal examination being made.

Once the patient has been admitted, she should be treated expectantly. A speculum is passed and preparations are made for transfusion, but no vaginal examination is made unless there is severe hemorrhage. All patients, however slight the hemorrhage, are advised to remain in hospital until confinement.

The chief justification for expectant treatment is that it gives the fetus a chance of reaching maturity. For cases of placenta previa, it is now established that cesarean section offers the best chance for the fetus and it is taking an increasingly important place in the treatment of these cases.

She has found little difficulty in persuading patients to remain in hospital for the long periods, eight or even ten weeks, that may be necessary. Shortage of hospital beds should not be admitted as a reason for not giving expectant treatment. Antepartum hemorrhage is one of the gravest of all obstetric emergencies and requires the best treatment.

Professor James Young said that the main conclusion from Mr. Macafee's paper was the considerable reduction in fetal mortality which could be obtained by the extension of the expectant treatment of placenta previa and without any addition to the maternal risk. Professor Young recorded the results of ten years' experience at the British Postgraduate Medical School, Hammersmith Hospital. In 108 cases of placenta previa the fetal mortality was 19.4%; 33 had been treated expectantly with a fetal mortality of 9%. During the first six years the total infant mortality (stillbirths and neonatal) was 29.2%, but with increasing resort to expectancy in the last five years this had been reduced to 13.4%. In 77 booked cases the infant mortality was for the whole period 13%.

Professor Young pointed out that, where the antepartum bleeding was due to accidental hemorrhage, expectant treatment had not reduced the infant loss. In a total of 162 cases the infant mortality was 32.7%. Of these 43 had been treated expectantly with a combined stillbirth and neonatal mortality rate of 30.2%.

Mr. A. W. Purdie said that in the maternity department of the North Middlesex County Hospital during the years 1940 to 1944 inclusive, there had been 143 cases of placenta previa among 6921 deliveries, with but one maternal death. Of 147 infants born, 100 or 68.00 per cent, remained alive; 20, or 13.6 per cent were stillborn and 27, or 18.4 per cent died in the neonatal period. The combined fetal mortality, hence, was 47 or 32.0 per cent.

Forty-one cases had been treated expectantly over periods varying from 12 hours to 67 days. The majority of these had been treated, at the end of the waiting period, by artificial rupture of the membranes or cesarean section (with or without examination under anesthesia) or had gone into labor spontaneously and had required no treatment.

No maternal death had occurred in any case treated expectantly.

Of 43 infants born to these mothers 32 (74.4%) had survived finally, 5 (11.6%) were stillborn and 6 (14%) died. The mothers of 16 of the surviving infants had had no recurrent hemorrhages in an average waiting period of 19.75 days; the average weight of their infants was 6 lb. 7 oz. The mothers of the remaining 16 surviving infants, however, had had an average of 1.5 recurrent hemorrhages during an average period of expectancy of 25.5 days; the average weight of their infants was 5 lb. 15 oz.

In the light of experience acquired in expectant treatment the stillbirths and neonatal deaths of the whole series had been reviewed. In the case of 4 still-born infants and 7 who died, their mothers might have been treated expectantly instead of actively on admission. In the case of a further 3 in each of these classes their mothers ought to have been treated expectantly.

Mr. Rufus C. Thomas supported Mr. Macafee's contention that placenta previa was not an obstetrical condition which must necessarily be dealt with at the first hemorrhage. He had adopted this attitude since 1937 during which time 182 cases had been treated. Many of them had been kept in hospital from two to ten weeks before being finally dealt with. The influence of such delay on the chances of survival of the fetus was shown by the fact that of the 182 cases, 125 were dealt with after the 38th week, and a further 25 cases between the 36th and 38th week. The fetal mortality for the whole series was 23%. Two mothers were lost, but neither died from hemorrhage. One died of pulmonary embolism on the 11th day after cesarean section. The other was a case of eclampsia with central placenta previa, who died in coma shortly after cesarean section.

Methods of treatment were on the same lines as those outlined by Mr. Macafee. During the period of expectancy, patients were blood-grouped, hemoglobin estimations done, and transfusions carried out if necessary. Apart from routine inspection of the cervix, nothing further was done, unless hemorrhage forced the

issue, until the time came for the full examination under anesthesia. This was carried out in the theatre, with all preparations for the cesarean section which might be found necessary. Each patient was assessed for treatment individually.

Mr. J. Stallworthy reported 119 consecutive cases of placenta previa treated at the Radcliffe Infirmary, Oxford, without a maternal death. He welcomed Mr. Macafee's suggestion that the old classification of placenta previa be scrapped but he advocated that in a case of antepartum hemorrhage much greater importance should be given to the position of the baby than to the position of the placenta. He felt this was a reform in obstetrical teaching and practice long overdue. He emphasized the importance of the placenta situated posteriorly in the lower uterine segment and illustrated this by a blackboard sketch to show how in such cases the true conjugate was shortened by the width of placenta lying over the promontory. This position of placenta was not uncommon and in his series of cases in 31 treated by cesarean section 14 had this type of placenta. Unless its importance was recognized it was most dangerous as it so often arrested descent of the presenting part and by making hemorrhage difficult to control placed both mother and infant in grave danger. In his opinion this type of case with the head above the brim should be treated by cesarean section.

The President said it was evident from the figures presented by Mr. Macafee that if the fetus was alive and viable one of two methods of active treatment of placenta previa should be adopted, i.e. rupture of membranes or cesarean section. Podalic version and bringing down a foot, or bringing down a foot if the breech presented, resulted in a fetal mortality that was far too high, and the same was true of Willett's forceps. Artificial rupture of membranes should, however, only be carried out if good contractions were present and the os dilating.

## ACUTE INVERSION OF THE UTERUS

A. W. SPAIN

J. Obst. & Gynaec. Brit. Emp., 53: 219-222, 1946

Case I. The patient had had one previous pregnancy with normal labor, but with a puerperal hemolytic streptococcal infection. In the present confinement the first and second stages of labor were uncomplicated. After an uneventful 25 minutes of the third stage the patient had a small amount of bleeding and passed into profound shock. The uterus was normal on abdominal palpation and nothing was visible at the vulva. Anti-shock treatment resulted in signs of recovery for 45 minutes; the placenta was still retained with no further hemorrhage. The patient then had severe abdominal pain and passed quickly into

profound shock. Palpation of the uterus even now did not suggest inversion; no sign of "cupping" was found, although the patient was thin. Vaginal examination was now made, which revealed complete inversion of the uterus. The placenta was removed and the inversion was reduced. Following reposition, the patient's condition immediately improved. Anti-shock measures were continued and sulfonamide therapy was started. Symptoms of diabetes insipidus were manifested on the sixth day and death occurred on the tenth day. Postmortem examination showed that the uterus was in good position with evidence of localized inflammatory processes. There was complete necrosis of the anterior pituitary, with partial necrosis of the posterior lobe.

Case II. This patient's first delivery was followed by severe postpartum hemorrhage and manual removal of the placenta. The second confinement was normal. In her third confinement the first and second stages of labor were normal, but after 15 minutes there was slight vaginal blood loss and the patient passed into profound shock. The uterus appeared quite normal to palpation and nothing was visible at the vulva. Nevertheless, immediate vaginal examination was made which revealed complete inversion of the uterus. The placenta was removed and the inversion reduced. The patient recovered.

In neither of these 2 cases were any of the alleged causes for inversion present. In both cases, however, there was fundal insertion of the placenta, and the author suggests that placenta accreta may have been a factor, since in these cases there were present 2 of the usually cited predisposing conditions for placenta accreta—one had a severe infection at her first confinement, and the other had a manual removal of the placenta.

These cases bear out very clearly that inversion of the uterus should be suspected when unexplained shock arises in the third stage of labor, and that the patient should be examined vaginally at once. They also emphasize the importance of immediate reduction in treatment of the shock resulting from this accident.

## FETAL MORTALITY IN BREECH DELIVERY

W. J. DIECKMANN

An. J. Obst. & Gynec., 52: 349-361, 1946

The average gross fetal mortality in breech delivery is 7.7 per cent, corrected to 4.2 per cent, for term fetuses on 5 maternity services. The mortality in prematures is over 25 per cent. Procedures which have been suggested to decrease the mortality are external cephalic version in all cases, and elective cesarean section in primiparas at term where version fails.

The author analyzes the breech deliveries occurring at the Chicago Lying-In Hospital during the last 4 years. There were 524 babies weighing over 2500

Gm. and 80 premature babies. The causes of death in this hospital associated with breech delivery have been prematurity, intracranial injury and asphyxia because of inability to deliver the head (usually because of an incompletely dilated cervix). The fetal mortality was greatest in the prematures and abnormally large babies. The omission of sedative drugs, use of local anesthesia and the ability to recognize a completely dilatable cervix are important factors in decreasing the mortality of prematures. Careful evaluation of the fetal and pelvic size and of the character of labor early enough to permit performance of a safe cesarean section may aid in reducing the mortality of babies weighing 4000 Gm. or more.

The incidence of fetal injury in the present series was 2.1 per cent. Deep anesthesia, experience and lack of haste will decrease the possibility of injury.

Cesarean section was performed in 67 cases, with 2 neonatal deaths; one a 1550 Gm. fetus from a patient with placenta previa, and one a 1240 Gm. fetus in a toxemic patient.

There were 2 maternal deaths in this series. A primipara with severe pre-eclampsia had a cesarean section at 32 weeks' gestation and died from pulmonary embolism. A primipara with heart disease and pre-eclampsia delivered twins, decompensated during labor, and died 40 hours post partum.

Vaginal bags were used in about 10 per cent of the primiparas and 3 per cent of the multiparas. The author feels that a more extensive use of bags would probably have resulted in a lower fetal mortality.

In regard to the management of breech presentations, after 32 weeks an external cephalic version should be attempted and repeated at weekly intervals if the breech presentation recurs. No undue force and no anesthesia should be used during external version. A patient with breech presentation after 35 weeks' gestation in early labor or with ruptured membranes should be carefully evaluated, and delivery should be by cesarean section if the pelvis is (1) contracted or (2) borderline with a large baby. Final decision as to management should be made after 6 to 18 hours of labor and/or ruptured membranes.

Large doses of analgesic drugs should not be used unless the labor is normal. In the test of labor, one should be guided mainly by the length of time it takes for the cervix to dilate. If the cervix dilates completely, 4500 Gm. babies can be delivered from most pelves by a skilled obstetrician.

A systematic outline for the management of breech delivery is presented, but it is pointed out that each case must be considered individually. The important steps in breech delivery may be summarized as follows: (1) prompt recognition of abnormal labor; (2) delivery, if there has been no descent for one hour and the cervix is completely dilatable; (3) deep surgical anesthesia with chloroform or drop ether; (4) deliberation in delivery; (5) deep episiotomy when the feet are through the vulva; (6) in the difficult case the baby's body must be slowly rotated back and forth with slight traction until one of the scapulae appears under the symphysis; the fingers can then be hooked in the elbow, or the humerus can be splinted and the arm wiped over the baby's chest and de-

livered, and the other shoulder rotated anteriorly and delivered (Potter); (7) the Celsus-Wiegand-Martin maneuver (flexing head and pressing suprapubically) for delivery of the head, or combined with forceps. Cesarean section should be used more frequently in primiparas at term with large babies presenting by breech. 1 figure.

## THE FETAL RISK IN BREECH DELIVERY; A STUDY BASED ON 708 CASES

H. B. GUYER AND C. E. HEATON

*Am. J. Obst. & Gynec.*, 52: 362-371, 1946

In an effort to ascertain the fetal risk inherent in breech delivery, the authors have analyzed 708 cases of primary breech delivery occurring at Bellevue Hospital over a 10-year period. The total number of deliveries during this time was 15,398, giving an incidence of breech presentation of 4.6 per cent. The methods of breech delivery are classified as spontaneous breech delivery, assisted breech delivery (assistance in delivery of shoulders and head), and breech extraction (operative interference begun before passage of breech over perineum). The last procedure is carried out only for specific indications, chiefly prolongation of the second stage.

In this series of breech deliveries there were 220 deaths, or a gross fetal mortality of 31.0 per cent. After deduction of cases with various complications (non-viable infants, premature infants, twins, prolapse of cord, maceration of fetus, congenital defects, pre-eclampsia and eclampsia, premature separation of placenta, placenta previa, hemorrhagic disease of newborn, icterus gravis, etc.), there remained 352 normal breech deliveries with 16 fetal deaths, giving a corrected fetal mortality rate of 4.5 per cent. There were 12 fetal deaths in 163 uncomplicated primiparous breech deliveries (7.4 per cent) and 4 fetal deaths in 189 uncomplicated multiparous breech deliveries (2.1 per cent), showing that the fetal risk in primiparas is over 3 times greater than in multiparas.

Of the 16 fetal deaths in cases of uncomplicated breech delivery, 11, or 69 per cent, showed evidence of birth injury on autopsy. Of these 11 cases, 8, or 73 per cent, showed evidence of slight to moderate disproportion between fetus and pelvis.

Cesarean section was performed in 16 cases of breech presentation during the period of this study; pelvic disproportion was the indication in 12 cases. All infants delivered in this manner were discharged well from the hospital.

It is concluded that the principal way by which the fetal mortality due to breech presentation may be lowered is the recognition of cases showing slight to moderate degrees of pelvic disproportion, and their treatment by elective or early cesarean section.



## MATERNAL OBSTETRIC PARALYSIS

J. T. COLE

Am. J. Obst. &amp; Gynec., 52: 372-386, 1946

The author reports 7 cases of maternal obstetric paralysis occurring in a series of approximately 45,000 deliveries at the Woman's Clinic of the New York Hospital. From a study of these cases it appears that the majority of cases of obstetric paralysis will exhibit a combination of the following characteristics: primipara, prolonged labor, difficult forceps delivery and cephalopelvic disproportion. In addition, x-ray studies show that the pelvis will present certain characteristic features. These are a short posterior ileum, a sacral ala with shallow anterior concavity, and a promontory which does not encroach on the posterior pelvic capacity.

Pain during labor, referred along the course of the sciatic nerve, is the earliest sign. As labor continues the pain increases in severity, and may be associated only with uterine contractions. Various paresthesias occur. Spasmodic contractions of muscles and paralysis may be observed. In many cases the condition escapes notice until several days after delivery. The degree of nerve involvement varies, but paralysis of the flexors of the foot, or "foot drop", is a rather constant finding. Any patient who develops these symptoms in labor and/or puerperium should have an immediate neurological examination.

A historical review of maternal obstetric paralysis is presented and the various theories as to etiology are discussed. The pressure theory, originally advanced by Hünemann, appears to be the most common cause of paralysis. The author concludes that maternal obstetric paralysis is due chiefly to trauma of the lumbosacral cord by the fetal head, or by instruments. If, in addition to cephalopelvic disproportion, a pelvis is present in which the posterior ileum is short, the ala of the sacrum has only a shallow anterior concavity, and the promontory does not encroach on the capacity of the posterior segment, it seems reasonable that the portion of the vertex in relation to the ala can exert real pressure on the lumbosacral cord when the fetal head seeks an obliquity.

The prognosis as to degree and speed of recovery must be guarded. The prevention of obstetric paralysis depends on recognition of the signs of lumbosacral cord compression, careful evaluation of the patient, and a correct decision as to the method of delivery. Should signs of lumbosacral cord compression appear, the dangers of instrumental vaginal delivery should be borne in mind, and cesarean section might be considered the operation of choice. Unfortunately, these signs appear so late in labor that cesarean section does not seem wise.

Treatment of obstetric paralysis consists of support of the injured extremity, active and passive motion, galvanic stimulation, vitamin therapy and the use of a walking brace. 7 figures.

## THE CONTROL OF INFECTION IN OBSTETRICS

L. COLEBROOK

J. Obst. &amp; Gynaec. Brit. Emp., 53: 114-124, 1946

The writer discusses the aerial transmission of bacteria, as it may contribute to the understanding of puerperal fever. Aerial transmission has been visualized chiefly as direct transmission by salivary spray from the mouth, but evidence in recent years has suggested a different view, that is, that indirect transmission probably plays an important part. If streptococci from the respiratory tract or elsewhere in the body are frequently deposited upon dust particles and dispersed through the air, then the wearing of masks will often fail to give complete protection.

R. Cruickshank has demonstrated that the air of the Burns Ward at the Glasgow Royal Infirmary, which housed many patients infected with streptococci, was often contaminated by those organisms, while the general surgical wards of the same hospital yielded few or none, and he failed to grow any from the air of the medical wards. In addition to this evidence, at least 3 papers have reported puerperal fever outbreaks in which the authors have considered it probable that dissemination of the streptococci was by way of the air. Also, an impressive body of evidence has accumulated from non-obstetric sources during the war which warrants these conclusions: (1) that pollution of the air by patients discharging streptococci or other pathogens occurs much more commonly and on a far greater scale than generally has been recognized; and (2) that bedding and dressings play a large part in this pollution of the air.

The author and Dr. Bourdillon have recently obtained evidence along these lines, employing the "Slit-Sampler", devised by Bourdillon, Lidwell and Thomas, for determining the bacterial content of the air. "Bacteriographs", as the records by this instrument may be called, show that the bacterial content of the air was raised during the dressing of a small knee burn, involving the disturbance of bandage and wool. Other bacteriographs reveal an increase in bacterial content of the air during various burn dressing procedures, and a marked decrease after the dressing was completed and the patient had been gone from the room for a period of time. Other bacteriographs show the pollution of air which results from liberation of fluff from blankets and woolen bedclothes.

Such evidence shows that whenever dressings are removed in an open ward or in the operating theatre, whenever even pads are changed in a lying-in ward and whenever beds are made, very large numbers of microbes are scattered through the surrounding air. The majority of these microbes are harmless, but not infrequently in hospital work these will be mixed with a considerable number of human pathogens. In this connection it is well to remember that about one to 2 per cent of all patients are nasal or heavy throat carriers of hemolytic streptococci, and a much larger number are skin or nose carriers of *Staph. aureus*.

For the control of air-borne infections, the author proposes the following measures:

1. Floors should be oiled every 2 or 3 weeks.
2. Maternity institutions, if part of a general hospital, should be separate blocks.
3. There should be more generous provision of single-bedded wards for immediate removal of febrile cases.
4. All rooms should be so designed as to allow for sealing for fumigation.
5. Ideally there should be separate quarters for nurses working in "clean" wards and those for febrile cases. Throat swabs should be taken before nurses are transferred from infected to clean wards.
6. Blankets and other woollens should be oiled, and bedding from clean and infected wards should be laundered in separate plants.
7. There should be proper ventilation of labor wards, operating rooms, etc., with dust-free air.
8. There should be a 24-hour bacteriological service in all larger maternity institutions, so that swabs may be planted at any hour. 6 figures.

## PUERPERAL INFECTION

J. H. E. WOLTZ

Am. J. M. Sc., 211: 743-751, 1946

This paper consists of a review of puerperal infection, including source of infection, bacteriology, morbid anatomy, diagnosis, prognosis, treatment, conduct of labor and chemotherapeutic and antibiotic agents used in combating this complication.

Wounds in the birth canal following parturition may serve as portals of entry for microorganisms, but the chief etiological factor in puerperal infection is the carrier who transmits virulent bacteria to the birth passages. Infectious spray from the nose and throat of attendants or from the parturient may be the source of contamination, as well as coitus or douches prior to or during labor. Any break in aseptic technique in delivery, catheterization and inadequate post-partum care of the vulva may likewise be sources.

The organisms most often identified in the severe and fatal cases are the hemolytic streptococcus, the anaerobic streptococcus, *Staph. aureus* and *Clostridium welchii*. The virulence of the organism responsible for the infection seems important. Bacterial synergism may account for some cases of severe puerperal sepsis.

Infected tears of the vulva and vagina react as do similarly infected wounds elsewhere in the body. When the uterus is infected the condition is known as endometritis. Less virulent organisms tend to remain confined to the endometrium; a more virulent organism or a diminished defensive reaction may lead to rapid invasion of the blood stream, or lymphatic extension to the myometrium, parametrium and peritoneum. Infection of the myometrium may or may not

precede or accompany parametritis. Infection that spreads through the lymphatics beyond the uterus may be checked in the pelvic cellular tissue, with the development of pelvic cellulitis. Extension of infection through the lymphatics to the peritoneum is more frequently the last step in the sequence of events including endometritis and parametritis. If Nature's attempts to limit the infection to the pelvis by the formation of adhesions fail, general peritonitis results. If the thrombi which are normally present in the uterine sinuses following delivery become infected, the surrounding vessel walls show evidence of phlebitis. The process may extend outside the uterus to the iliac and femoral veins. Thrombophlebitis may lead to metastatic lesions, most frequently in the lungs. If the puerperal infection is gonorrheal in origin, it usually extends to the uterus from a quiescent infection of the cervix or lower birth passages, advancing along the structures to result in typical gonococcal salpingitis.

A postpartum patient with a temperature rise of 100.4 degrees F. on any 2 days, exclusive of the first 24 hours, is considered morbid, and the fever is considered pelvic in origin until otherwise proved. With the spread of infection the patient's feeling of well-being leaves her, and she may complain of headache, loss of appetite, fatigue, sleeplessness and chilliness. Pelvic pain and tenderness may warn of beginning invasion of the parametria. The gravity of the patient's condition is indicated by degree of temperature, character and rate of pulse and respiration, change in leucocyte and red blood cell count, and blood and cervical culture. An enlarged, soft and tender uterus usually is present in cases of endometritis. When pressure on the abdomen causes pain, and rebound pain is elicited, peritonitis should be considered a definite possibility.

Differential diagnosis must be made from pyelitis. Upper respiratory infections must be kept in mind. Pneumonia must be considered, especially in patients who have received inhalation anesthesia.

As long as the infectious process is localized to the vulva, vagina and endometrium the prognosis is favorable. It becomes less favorable as infection spreads. General peritonitis and bacteriemia carry a poor prognosis.

As to treatment, all foci of infection should be eliminated as early in pregnancy as possible. The general health of the patient, with correction of anemia, is important. Vaginal douches and coitus must be avoided during the latter months of pregnancy. Youth is a great ally in combating infection. The author stresses the importance of proper preparation of the patient for labor and delivery and of the proper conduct of labor and delivery. The high incidence of puerperal morbidity following postpartum hemorrhage is well known, and the majority of these hemorrhages have been attributed to mismanagement of the third stage of labor. Blood transfusions are of utmost importance in treating puerperal infection. They should be employed early and continued until recovery is certain. Elevation and wrapping of both legs, heat cradle and keeping the patient well hydrated and at rest are the usual methods of therapy in phlebitis, thrombophlebitis and phlebothrombosis. Surgical measures in puerperal infection are limited to incision and drainage of pelvic abscesses.

Of the chemotherapeutic agents, penicillin should prove to be the drug *par excellence* in the prevention and treatment of puerperal infections. Most of the work on penicillin in obstetrics has been to prove its transmission across the placenta to the fetal circulation and amniotic fluid. Its prophylactic use in patients with prolonged labor and premature rupture of the membranes has been suggested. In the treatment of actual infection, the tendency is to use much larger doses of the drug if the usual daily doses of 100,000 to 200,000 units do not result in clinical response. In severe cases the drug should be continued for several days after temperature and pulse have become normal.

At present, insufficient clinical studies have been reported on the use of streptomycin in puerperal infection, but it may prove to be a valuable addition to the present armamentarium.

## THE NEWBORN

### ABNORMAL PRESENTATIONS AMONG MALFORMED INFANTS; WITH SUGGESTIONS CONCERNING THE ETIOLOGY

R. L. YOUNG

Am. J. Obst. & Gynec., 52: 419-427, 1946

In this paper the author reviews the methods of presentation of 1471 congenitally malformed fetuses weighing over 400 Gm., and compares them with the presentations of all infants (17,728) weighing over 400 Gm., which were delivered at the Chicago Lying-In Hospital over a 6½-year period. Of the 1471 cases, 17.5 per cent were delivered from presentations other than occipital. Among the control group, presentations other than occipital occurred in 4.4 per cent of the cases. Thus, breech presentation, transverse presentations and cephalic attitudes of deflexion occurred 4 times as often among the malformed fetuses as among the 17,728 consecutive deliveries.

Among the malformed infants weighing 2500 Gm. or more, presentation other than occipital occurred in 22.7 per cent. Among those in the control group which weighed 2500 Gm. or more, 3.3 per cent presented by a part other than occiput. Thus, the larger malformed infants presented abnormally about 7 times as often as did the larger babies in the control group. These statistics disprove the idea that the smaller size of malformed fetuses is the determining factor in the increased incidence of breech presentation seen among them, rather than the malformations themselves.

In an attempt to learn the reason for the many abnormal presentations among malformed fetuses, the author reviews the factors claimed to be of etiological importance in this respect. Among the 1471 malformed fetuses, complications which are alleged to cause breech presentations occurred as follows: abruptio placenta, 2.2 per cent; multiple pregnancy, 3.2 per cent; pelvic and uterine tumors, 1.1 per cent; bony pelvis deformities, 4.7 per cent; placenta previa, 2.3 per cent; polyhydramnios, 7.2 per cent; uterine anomalies, 1.1 per cent. Most critical studies in the recent literature agree that, of the many factors, only prematurity and fetal malformations occur often enough to explain more than a very few abnormal presentations.

Multiparity was not a significant factor in the production of malformations, nor was advanced maternal age, except in achondroplasia and mongolism. The relationships of the alleged factors to fetal malformations have been studied and their significance was shown to be either nonexistent or very slight.

The author believes that he has demonstrated that something inherent in malformed fetuses causes frequent abnormal presentations. After studying large series of breech presentations among normal infants, Vartan and Stein have each arrived at the conclusion that fetal attitudes of deflexion (of head and

also of extremities) are of primary importance in predisposing to breech and transverse presentations. Vartan found that 37.3 per cent of 969 breeches showed extension of the legs, 32.7 per cent multiple pregnancy and prematurity, and only 4.5 per cent placenta previa and/or contracted pelvis. Deflexion attitudes have been reported to occur in over 80 per cent of all breech presentations among normal fetuses.

Evidence is presented which suggests that in the various types of malformation occurring most frequently, the malformations have caused a deflexion attitude. Thus, a deflexed attitude of the hydrocephalic head is common. The heads of anencephalics are similarly held in extension. The spinal columns of infants with spinal rachischisis are invariably extended to some degree. In fetuses with urinary tract anomalies, normal flexion may be prevented by abdominal enlargement.

It is felt that the factor of deflexion explains most satisfactorily the unusual frequency of abnormal presentations among malformed fetuses, and that it is also important in the etiology of abnormal presentations among normal fetuses.

## SOME OBSERVATIONS UPON THE RH FACTOR IN PREGNANCY

C. H. INGRAM

*Am. J. Obst. & Gynec.*, 52: 440-445, 1946

This paper aims to present no final conclusions, but the author lists some impressions formed as a result of treating 6 cases of erythroblastosis fetalis. These 6 cases were encountered in a total of 1682 deliveries, an incidence of one case per 280 deliveries. They occurred with an incidence of one in 12.5 Rh-negative women.

The 6 cases of erythroblastosis fetalis are presented and, on the basis of experience in treating them, the following rules of conduct are suggested, in chronological order of caring for a case of pregnancy:

1. An Rh determination should be made for all pregnant women at the same time that their blood test for syphilis is done.

2. A careful history of previous transfusions as well as pregnancies should be taken on all pregnant women found to be Rh-negative, and the donor's blood should be tested for the Rh factor before delivery. Only Rh-negative blood should be transfused into any Rh-negative woman still in the reproductive period.

3. All Rh-negative multigravidas and those previously transfused with Rh-positive or unknown blood should be tested for agglutinins and blocking antibodies during the last 3 months of pregnancy.

4. In cases with either marked agglutination or blocking reaction, a full blood study of the infant should be made in the delivery room and, where indicated by red count, Rh-negative blood should be given via the umbilical vein prior to tying the cord.

5. If transfusion is indicated, only Rh-negative blood should be used. In the writer's cases, whenever group O blood was used Witebsky's A and B substance was added.

6. As to route of administration—once the cord is tied the author has found a 22-gauge cannula in a surface vein behind the blood supplied by a syringe of an intravenous anesthesia outfit to be the best. One intraperitoneal injection gave results almost equal to intravenous administration, but because the infant went into mild shock following the procedure, the author has hesitated to repeat it.

7. Babies with erythroblastosis should not nurse, as the breast milk contains anti-Rh agglutinins.

8. The prognosis for affected babies must remain guarded in view of neurologic residua such as spasticity and mental retardation attributed to kernicterus.

9. At present, the outlook for future babies seems to depend first, on another baby being Rh-negative with no danger of trouble, and second, on the possibility of survival of an Rh-positive baby appropriately treated.

10. The author is opposed to the induction of labor before term in these cases because of the added dangers of prematurity to be overcome.

## HEMOLYTIC DISEASE ASSOCIATED WITH THE RH FACTOR IN TWIN PREGNANCIES

E. A. CONTI AND J. W. GLENN

*Am. J. Obst. & Gynec.*, 52: 446-450, 1946

The authors reviewed a series of 110 multiple pregnancies (109 twin, one triplet) and found that in 22 cases one or both children were stillborn or neonatal deaths. Sixteen of these were eliminated from further study because of incompleteness of records or elements mitigating against Rh incompatibility as a causative factor. The remaining 6 cases were studied clinically serologically, and the results are presented in this paper.

Case I. The father was Rh-positive and the mother Rh-negative. The first twin was an Rh-negative male and the second was an Rh-positive female stillborn. The second twin was assumed to be Rh plus because of its typical hydrops. Levine has stated that the capacity to produce anti-Rh agglutinins differs in individuals so that in some women the first pregnancy may result in an erythroblastotic infant. It is possible that the blood of the surviving twin also produced antibodies which contributed to the demise of its mate.

Case II. The father was Rh-positive and the mother Rh-negative. The first twin was an Rh-positive male and the second an Rh-positive male stillborn. The first child was quite anemic but survived with massive doses of vitamin K. The second twin was a macerated fetus. Three years later the survivor showed a mental age of about 6 months. Wiener has referred to the occurrence of feeble-



mindfulness as a result of erythroblastosis, ascribing it to kernicterus or portal cirrhosis. It may be assumed that monozygotic Rh-positive twins will result in a proportionately increased response in the maternal circulation.

Case III. The father was Rh-positive and the mother Rh-negative. The first set of twins was an Rh-positive male and an Rh-positive female, both normal and now past 6 years of age. The second set of twins was 2 Rh-positive females. The first exhibited moderate anemia at birth but is now apparently normal. The second child was stillborn, presenting the typical picture of icterus gravis. The second twins in this case again illustrate varying response to antibody exposure or perhaps a difference in accessibility to maternal antigens.

Case V. Father and mother both were Rh-positive. The first child was a normal Rh-positive female. Later, a twin pregnancy resulted in 2 Rh-negative males. The second twin was normal. The first weighed 6 lb., 11 oz., and had a large head with wide sutures and fontanelles. Respirations were poor and the skin very pale. On the second day he began to have dark red bleeding from mucous membranes, and died 11 days after delivery. An Rh determination was not made and the authors have placed the child in his brother's Rh category because the pregnancy was monochorial. The autopsy diagnosis was immaturity. In view of the anemia and bleeding from mucous membranes, it is believed that this child's condition might be explained by the presence of an Hr factor. The authors have had both an Rh-positive infant of an Rh-negative mother and an Rh-negative infant of an Rh-positive mother who were well at birth but subsequently developed melena. Both were promptly controlled by transfusions of Rh-negative blood and withdrawal from breast feeding.

## THE INFLUENCE OF HUMAN SERUM ALBUMIN ON EDEMA IN ERYTHROBLASTOSIS FETALIS

M. JACOBI, A. LITVAK AND S. GRUBER

J. Pediat., 29: 177-182, 1946

The treatment of erythroblastosis fetalis in recent years has been aimed largely at combatting the anemia by means of blood transfusions, and no attempt has been made to reduce the edema in the more severe cases. Experience at the Beth El Hospital in New York has demonstrated that the edema is not due to anoxemia, but is associated with a lowered osmotic pressure because of low blood proteins, which in turn is caused by liver damage.

Two cases complicated by severe generalized edema successfully treated with concentrated human serum albumin are reported. The first was one of twins. The treatment was quite effective and dramatic in reducing the edema. His twin, however, was given 2 whole blood transfusions but died 54 hours after delivery. In the second case the child was transfused with whole blood once

daily for 3 days without improvement. On the fourth and fifth day concentrated serum albumin (6.25 gms.) was given and a marked diminution in edema was noted in 6 hours.

From blood studies in the last case it was noted that despite early transfusions there was a marked drop of 1.1 gms. in the serum protein. With this fall the edema appeared and with its correction the edema disappeared. The positive cephalin flocculation test (3+) and a prolonged prothrombin time showed marked liver damage, and the fall in the flocculation was taken as an indication of the recuperative power of the liver.

## TREATMENT OF EPIDEMIC DIARRHEA OF THE NEWBORN

M. J. GLYNN

J. Pediat., 29: 205-209, 1946

The term, "epidemic diarrhea of the newborn", refers to a disease occurring in newborn nurseries, characterized by the passage of frequent, watery stools, dehydration and varying toxicity, with a tendency to involve many infants simultaneously.

The etiology of this disease is unknown. Some epidemics are caused by a filterable virus; occasionally a bacterial pathogen is responsible. The epidemiology is likewise obscure. However, it may be carried from infant to infant by the doctor and nurses. Prophylaxis is aimed at minimizing exposure of the infants, detecting adult carriers, and possibly by immunization.

Treatment of the disease is still symptomatic, and consists of the following measures:

(1) Relief of the Diarrhea by Starvation.—The duration of starvation usually lasts 24 to 36 hours. The requirements for refeeding are: absence of stools for 12 to 24 hours, return of blood serum  $\text{CO}_2$  to normal, and improvement in physical findings. Sterile tap water in small amounts is used for the first 24 hours. This is replaced cautiously by formula which is gradually increased to 120 calories per kilogram of body weight.

(2) Replacement Therapy.—This is designed to combat the vasomotor collapse, dehydration, acidosis, anemia, and low serum proteins by increasing blood volume, restoring renal function and correcting dehydration. A clysis of normal saline or 1/6 M. sodium lactate (40 cc. per kg.) is started immediately. Following this an infusion of 10 per cent glucose (20 cc. per kg.) is given. Then whole blood or plasma is used as indicated.

(3) Maintenance Therapy.—The transition from replacement treatment should be gradual and should aim at maintaining the normal factors. One to 1½ gms. of sodium chloride in isotonic solution should be given per day, parenterally. One hundred and fifty to 175 cc. of 5 per cent glucose per kg. per day is used. Amigen and multiple vitamin therapy are also valuable adjuncts.

Between January 1, 1940 and December 31, 1944, ninety-one full term infants under 4 weeks of age were treated by this method with 12 deaths, a mortality rate of 13 per cent. Of 92 premature infants similarly treated in the same period there were 18 deaths, a mortality rate of 17 per cent.

## THE STATISTICS OF PREMATURITY; A PLEA FOR STANDARDIZATION

J. L. HENDERSON

Arch. Dis. Childhood, 21: 105-109, 1946

At present there is a great necessity for standardizing the method of presenting statistics on prematurity. If any accurate comparisons are to be made between various methods of care and treatment in different maternity hospitals, a uniform method of statistical presentation and analysis should be sought. The author suggests that the following 7 conditions should provide a satisfactory statistical basis:

1. A large number of infants: There should be 500 or more consecutive cases if significant conclusions are to be reached. The importance of this becomes apparent when subdividing prematures into weight groups. If a small number of cases is considered the proportion of infants in the light weight bracket will be very small and therefore statistically insignificant.

2. Accurate weighing at birth.

3. Strict interpretation of the definition "liveborn": As defined by the American Academy of Pediatrics, "a premature infant is one who weighs 2500 gms. ( $5\frac{1}{2}$  pounds) or less at birth (not on admission) regardless of the period of gestation." All liveborn premature infants should be included, evidence of life being heart beating or breathing. Those infants dying within a few hours after birth should not be classified as "stillborn".

4. The inclusion of all liveborn infants with congenital malformations: For statistical accuracy all liveborn infants with congenital malformations, no matter how severe, even if regarded as incompatible with survival, should be classified as livebirths.

5. Definition of the weight range of viable prematurity: The maximum weight standard of 2500 gms. ( $5\frac{1}{2}$  pounds) is an excellent choice because it constitutes an appropriate dividing line between clinically mature and immature babies, and also because there is an exact correspondence between avoirdupois and the metric systems. A minimum weight standard of 1250 gms. ( $2\frac{3}{4}$  pounds), based on a 28 weeks' gestational period as the time of viable prematurity, is a good choice because the average weight of infants of 28 weeks' gestational age lies between  $2\frac{1}{2}$  and 3 pounds, and because  $2\frac{3}{4}$  pounds corresponds to 1250 gms.; also, these figures are exactly one-half the maximum weight standard, and are therefore easy to remember.

6. Subdivision of the standard weight range of prematurity into standard

halfpound weight groups: If the metric system is used, subdivision into five 250 gm. subdivisions would be satisfactory.

7. Segregation of the infants of booked mothers from those of unbooked mothers: "Booked" refers to patients who voluntarily arrange for their prenatal and hospital care; "unbooked" mothers are admitted to the hospital as emergencies. It is statistically essential to analyze the infants born of booked and unbooked mothers because there is a great difference in the weight distribution in the 2 groups, and the prognosis is much poorer in the unbooked cases.

## BEHAVIOR ASPECTS OF THE CARE OF THE PREMATURE INFANT

A. GESELL

J. Pediat., 29: 210-212, 1946

The psychology of preterm infants with post-conceptional ages varying from 28 to 40 weeks was studied and then interpreted in terms of their muscle tonus.

Tonus is a key concept because it is behavior. Tonus is a condition of muscle tension mediated by the autonomic and central nervous systems. Weak individuals are considered to have low tonus; the dying are losing tonus; and the dead have no tonus. Therefore, at the infant's threshold of viability, all measures which safeguard, foster and maintain an optimal tonus are of critical importance in the care of the premature infant.

Tonus has its true origin in the structural maturity of the organism, but can be partly controlled by such factors as temperature, humidity, body fluids and metabolic level. The fetal infant initiates the first tonal responses and these organize with age. At 28 to 32 weeks muscle tone is at a low level and has 3 characteristics, namely, it is fluctuant, patchy and precarious. At 36 to 40 weeks tone is steady, consolidated, sustained, patterned and adaptive.

The progression towards organized tonus is the essence of the psychology of the fetus. His mental life is one of kinesthesia and tactility. Hence, his mental health is dependent upon the satisfaction of bodily movements and the ancient sensorium of skin and mucous membrane. There are 4 practical possibilities in routine care and management of prematures suggested from this study.

*Clothes.*—To restore some of the advantages of intrauterine life, snug clothes which bundle the torso but leave the arms free are suggested. This pressure upon all parts of the sensitive skin helps maintain a comfortable minimal level of tonus.

*Cleansing.*—The right amount of mild stimulation by means of a warm bath will contribute to the infant's developmental welfare.

*Handling.*—Skillful handling rather than none at all is desirable. It should be brief because tonus readily tires.

*Bedding.*—A mattress of resilient material suspended on sensitive springs imparts a sense of movement and may have a favorable effect on development of body tone.

## OPERATIVE OBSTETRICS

### SIXTY-FOUR CONSECUTIVE CASES OF SYMPHYSEOTOMY

ALFREDO BAENS

J. Philippine M. A., 22: 49-56, 1946

The results of the author's experience with symphyseotomy have been so encouraging that he has not hesitated to section the symphyseal joint whenever indications and conditions for its use arise. The present paper includes a discussion of the procedure and a report of the results in 64 consecutive cases.

An absolute requisite to good technic of operation and to full appreciation of its dangers is a thorough understanding of the regional anatomy, which the author describes. The pelvic diameters are greatly increased with the gaping of the bones, there being a relatively greater increase towards the transverse and oblique diameters than towards the antero-posterior diameters. The general rule is that for every centimeter of separation, there is a gain of 2 mm. at the obstetrical conjugate. When the conjugate vera is less than 7.5 cm., or when the fetal head is too large for a pelvis nearly or entirely normal, or when the presenting diameter is long because of error of attitude of the child's head, one should be careful in deciding for symphyseotomy, lest the bones gape beyond the maximum and impair the sacroiliac joints.

All cases in the present series were with cephalo-pelvic disproportion; the indications were all secondary to failed forceps application and extraction. A number of cases were neglected and presented definite signs of infection.

The technic is as follows: With the patient in the advanced lithotomy position, the urinary bladder is carefully emptied. The applied forceps is not withdrawn. If the anterior blade is in the way it is glided to one side and rotated back into place after the joint has been cut. The author follows the subcutaneous approach, and is careful that the point of the knife does not penetrate beyond the space of Retzius, to avoid injury to the bladder and urethra. The left index finger is inserted into the vagina, posterior to the symphysis pubis, to push the urethra towards the right side (a urethral catheter facilitates this step). A straight, narrow bladed knife is held perpendicular to the anterior surface of the joint and is made to pierce the skin and subcutaneous tissue  $\frac{1}{2}$  cm. below the superior border. One hits the correct starting place when the point of the knife feels the gristly fibro-cartilage. The blade is oscillated downwards and forwards, increasing the reach of the knife as the ligamentum arcuatum is approached. This ligament is cut completely, care being taken not to cut the periurethral tissue where the pubo-vesical ligaments are situated. A slight traction of the head with the forceps completes the separation of the pubic bones, accompanied by a snap. If the separation is not effected by slight traction, the superior ligament is cut. In primiparas, to lessen the strain on the soft parts

proximal to the symphysis during gaping of the bones, a deep episiotomy incision is made. After delivery, the episiotomy wound in primiparas, any lacerations, and the skin puncture are sutured. A catheter is inserted into the bladder for 3 or 4 days. The anterior half of the pelvic girdle is strapped with adhesive plaster.

The present series of 64 cases included 53 primiparas. There were 11 multiparas with definite history of dystocia in previous deliveries. Two patients had intrapartum eclampsia, 21 were cases of right occipitoposterior, and 2 were cases of face presentation. All patients were given very much more than an adequate test of labor. Only a change in fetal heart rate and a stretching, thinning lower segment cut the test of labor. Five patients had 48 hours of labor; one, 55 hours; one, 60 hours; 4, 72 hours; one, 80 hours; one, 85 hours; and one, 96 hours.

Definite puerperal infection was evident in 17 cases; this is to be expected from the nature of the cases. Five developed pyelitis. Four cases developed partial loss of control of urination; all have been corrected by plastic restoration of the pubo-vesical ligaments. Ten patients have returned for succeeding deliveries. Five of these had spontaneous deliveries with their second pregnancies. Four have delivered twice since the symphyseotomy operation—one requiring 2 midforceps deliveries; one by midforceps once; and the rest spontaneously. Thus, symphyseotomy appears to have conferred on the pelvis a permanent enlargement for succeeding deliveries.

There was one maternal death, which could not be ascribed to the symphyseotomy itself. The mortality rate was 1.56 per cent. Any form of cesarean section after failed forceps, or in the presence of frank infection, would give a mortality rate of from 10 to 30 per cent. Morisani, using the open method of symphyseotomy, reported a mortality rate of 20 per cent. Schwartz, employing the subcutaneous approach, had a mortality rate of 2.65 per cent.

There were 2 stillbirths and 3 neonatal deaths. None of these was directly attributable to the operation.

The results in this series would seem to justify the use of symphyseotomy. In conclusion, the author enumerates the following advantages of the procedure: (1) It can prevent craniotomy on the living child in failed forceps extraction, when abdominal delivery offers greater hazards to the mother; (2) With proper skill, the dangers attending symphyseotomy can be minimal; (3) It is done quickly and simply, contributing the least shock to a patient subjected to a very long test of labor; (4) There is no invasion of the abdominal cavity; (5) Postoperative courses, despite the bad nature of the cases, are often smooth; (6) There is no uterine scar to cause fear of rupture in succeeding pregnancies and labors; and (7) There is improvement in pelvic capacity, thus enabling the patient to meet future requirements toward more natural delivery.

(In the United States symphyseotomy is an abandoned operation, and let it be noted that the inclusion of the above detailed abstract is not based on any desire to revive it. However, from the viewpoint of global trends in obstetrics, it is interesting that both Philippino and Latin American obstetricians are enthusiastic about it and are not a little perplexed when they come to this country and find that we practically never employ it. —Ed.)

## SOCIAL AND LEGAL ASPECTS

### THE MOTHER IN INDUSTRY

SIBYL HORNER

J. Obst. & Gynaec. Brit. Emp., 53: 177-181, 1946

The author discusses protective factory legislation for women in respect to the expectant mother, the nursing mother and the mother with young children.

There is not, in the author's country, legislation forbidding the employment of women in industry during any stage of pregnancy. The employment is terminated either on the instigation of the worker or the employer, and there is almost no disagreement between the 2 as to when during pregnancy industrial employment should cease. The usual procedure, when there is a medical service in the factory, is for the woman to seek advice from this department as soon as the fact of pregnancy is established. Her factory work is then reviewed in the light of the pregnancy; she should be removed from contact with toxic substances, from cold, wet or heavy work, particularly where this involves muscular strain of an intermittent or jerky nature, and from work which involves continual standing. The working hours would be modified to the individual's needs, and as a rule night-work would be avoided. Such changes might be thought to carry with them diminished wages, tending to postpone revelation of the pregnancy until it becomes apparent. This is the very thing to be avoided, because of the relative frequency of miscarriage during the first 3 months of pregnancy. Some firms have therefore declared in advance their policy of non-dismissal on the ground of pregnancy, and sometimes monetary benefits are given to compensate for shortened hours and change of employment. A few antenatal clinics have been established in factories during wartime; the general view is that such services in factories will function best if they ancillary to hospital and local authority clinics.

As to the results of the employment of women during pregnancy, the author cites the record of one factory in wartime; in 6 months, among 4905 female munition workers, there were 3 cases of abortion treated at the works' surgery, and 3 cases of amenorrhea. In other words "to be forewarned of pregnancy in a factory is to be forearmed."

The Public Health Act, 1936, S. 205, forbids the employment of a woman in industry within 4 weeks after the child's birth. Few women return within 6 months to a year of confinement. Some factories provided facilities in wartime for women to nurse their infants, but the author thinks that it will be agreed that it is not in the best interests of either mother or child for nursing mothers to be employed in factories.

While mothers in industry with young children can make use of nursery schools, their lot is unenviable. The position creates worse hardships for the women

themselves than for the children. In industry the married woman has 65 per cent more absence from illness than the unmarried woman. The author suggests that we shall never change the position with regard to sex difference in absence through sickness (men's rate is lower than women's) as long as women must work away from home and yet continue to fulfil their household obligations.



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# Maternal Mortality Reports

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*(Secretaries of Maternal Mortality Committees are invited to submit selected cases of maternal deaths, with analyses appended, for publication in this section of the Survey. Cases should be chosen on the basis of educational value, not because of rarity. For obvious reasons complete anonymity will be maintained.*

*Readers should note that the comment which follows each case history represents the opinion of the Committee concerned and does not necessarily reflect the attitude of the Editors.)*

## CASE NO. 27

The patient was a 24 year old white multipara with two living children whose past obstetrical history was non-contributory. The estimated date of confinement in this pregnancy was May 25, and she had received prenatal care since the beginning of the 4th month of her pregnancy. The pregnancy progressed quite normally and uneventfully until February 10, at which time the patient had slight painless vaginal bleeding lasting approximately three hours. With rest in bed for several days there was no recurrence of bleeding, and it was thought that she had had a threatened abortion at the 26th week of pregnancy.

Following this episode the patient had no further symptoms until April 1 when she had a sudden painless vaginal hemorrhage estimated at 250 c.c. Bleeding ceased entirely within an hour, and no treatment or investigation was undertaken. Ten days later, on April 11, the patient had a third episode of painless vaginal bleeding and was seen in her home by her physician around 7:00 A.M. The foot of her bed was elevated and she was instructed to remain in bed. At 5:00 P.M. of that day the physician was again called, because the patient had had further massive vaginal hemorrhage. She was found at home in profound shock and arrangements were made for her transfer to the hospital.

Upon admission to the hospital shortly after 6:00 P.M. the patient was in profound shock. She was given glucose and saline intravenously and her general condition improved slightly. At 6:45 P.M. she fell into spontaneous labor. Vaginal bleeding continued and the patient was given continuous oxygen and more glucose and saline intravenously. Sometime shortly after the onset of labor a vaginal examination was carried out which revealed a central placenta praevia and the cervix 7-8 cm. dilated. The placenta was perforated manually and a stillborn premature infant was delivered by breech extraction. Following delivery of the infant and placenta there was no further bleeding, but the patient remained in profound shock and died twenty minutes after delivery.

*Discussion:* It is perhaps permissible to have regarded this patient's first episode of vaginal bleeding at the 26th week of pregnancy as a threatened abortion, but it is difficult to understand how the significance of her repeated episodes of painless vaginal bleeding later in pregnancy could have been overlooked. The diagnosis of placenta praevia in this instance can be made with almost one hundred per cent certainty from the history alone, and yet she was allowed to remain at home until her condition had become critical. Prompt hospitalization, grouping and matching the patient for transfusion, investigation by sterile vaginal examination of the cause of the bleeding, and prompt performance of cesarean section once the diagnosis of central placenta praevia had been made

would undoubtedly have spared this patient's life. The committee, in addition to finding this death preventable on the above grounds, was also of the opinion that even as late as the time of her eventual admission to the hospital this patient's life could probably have been saved had there been facilities for immediate administration of whole blood. This case is one of several reviewed each year of patients succumbing from hemorrhage before blood can be administered. In the opinion of the committee the most urgent improvement necessary in hospitals accepting maternity patients is the establishment of facilities for prompt blood transfusion. This case further illustrates the futility of hoping that glucose and saline will take the place of blood.

#### CASE NO. 28

This patient was a 38 year old white primigravida with a normal pelvis by clinical measurements, negative STS, whose estimated date of confinement was February 7. She was followed prenatally by her physician from the third month of pregnancy and progressed normally. During the last month a flat plate of the abdomen was taken showing the fetus presenting by the vertex. The pregnancy progressed one week past the estimated date of confinement and the patient fell into labor spontaneously on February 14. Upon admission to the hospital on that date the cervix was found to be thick, hard, and to admit one finger. Pains, which were somewhat irregular on admission, gradually increased in intensity and frequency and she was given sedation and intravenous glucose. After approximately twelve hours of labor there was no change in the cervical dilatation and the patient was seen by a consultant who advised waiting a few more hours. After twenty hours of labor with no change in the state of the cervix abdominal delivery was decided upon.

Delivery was accomplished by classical Cesarean section, the operation requiring approximately thirty minutes. Some difficulty was encountered with atony of the uterus and the patient lost a somewhat excessive amount of blood but was given a transfusion of whole blood on the operating table. Her postoperative course was uneventful for the first two days, but on the morning of the third day the abdomen became distended and her temperature began to rise. Repeated enemata were given, prostigmine was administered and a Wangenstein tube was inserted, but in spite of these measures the distention became more marked and the temperature continued to rise. She was then begun on penicillin, but in spite of all therapy her course was steadily downhill, with distention and elevation of temperature being prominent. Death occurred on February 20, the sixth postpartum day.

*Discussion:* This case illustrates the too frequent sequence of labor-classical cesarean section-generalized peritonitis-death. It has been shown repeatedly that with every hour of labor cesarean section becomes increasingly more dangerous due to the increased incidence of peritonitis. The uterine cavity is normally sterile prior to rupture of the membranes or the onset of labor, but with each hour of labor or ruptured membranes the likelihood of bacterial invasion of the uterus is greater. This patient, therefore, after twenty hours of labor was at least potentially infected and should have been delivered by either low cervical section or extra-peritoneal section in order to minimize the risk from peritonitis. Aside from this fundamental error in the handling of this case, the committee was also of the opinion that cesarean section was too long delayed. In the face of sufficiently strong uterine contractions to require sedation and of no demonstrable dilatation of the cervix it was felt that twenty hours of trial labor

was excessive. It was further felt that this patient should have been started on penicillin prophylactically preferably during labor when the possibility of cesarean section first came up or at least immediately after delivery.

### CASE NO. 29

The patient was a 26 year old white primigravida who was seen by her physician for the first time on December 27, being at that time approximately 30 weeks pregnant. She had no complaints, the blood pressure was 126/80, weight 140 pounds, and the urine was free of sugar, albumin, casts, and cells. The only positive finding other than the presence of a normal intrauterine pregnancy was slight edema of the ankles. Because of this latter finding she was advised to restrict salt intake and to restrict liquids to 1000 to 1500 c.c. daily. When next seen on January 10 her weight was 142, blood pressure 110/80, and the urine was free of albumin. She had no complaints and there had been no increase in ankle edema. At her routine prenatal visit two weeks later on January 24 she complained of slight fullness in the head but was otherwise asymptomatic. On examination, however, her weight was 148½ pounds, blood pressure 170/110, and the urine contained a 2-plus albumin. She was instructed to return home and "go to bed in a quiet dark room."

Within less than twenty-four hours the patient complained to her family of a severe blinding headache and shortly thereafter had a generalized convulsion. She was seen at home by her physician who gave her 5 grains of pentobarbital sodium and 120 c.c. of magnesium sulfate intravenously followed one-half hour later by 50 c.c. of 50% glucose. Despite this therapy the patient had three more generalized convulsions at home while awaiting the arrival of an ambulance for transfer to the hospital.

She was admitted to the hospital six hours after the first convulsion. None of the details of her course following admission are known except that she was given sodium luminal, magnesium sulfate, and 50% glucose intravenously and that lumbar punctures were performed every six hours. She died undelivered fourteen hours after admission. The death certificate gives the cause of death as "right sided heart failure, due to toxemia of pregnancy." An autopsy was performed revealing dilation of the right auricle.

*Discussion:* The committee felt that in view of the meager data concerning this patient's treatment and course following admission to the hospital no opinion could be expressed concerning that phase of her care, but that this was clearly a preventable death on the basis of inadequate treatment prior to admission to the hospital. The patient exhibited all of the classical findings of a severe fulminating pre-eclampsia, namely excessive weight gain, an abrupt marked rise in blood pressure and the sudden appearance of albumin in the urine. There is a curious combination of both awareness and disregard of the implications of these findings in the physician's instructions to the patient to return home and "rest in a quiet dark room", since this phrase appears in most standard textbooks in relation to the treatment of eclampsia. Apparently the physician in this case was aware of the fact that his patient was likely to develop eclampsia, making it doubly difficult to understand why immediate hospitalization, adequate sedation, observation, and other standard methods of treatment of severe pre-eclampsia were not employed. Had the patient failed to respond within twelve to twenty-four hours of adequate therapy, termination of the pregnancy by either cesarean section or induction of labor, depending on the condition of the cervix, would have been indicated. Such a program would most probably have prevented the development of eclampsia and saved this patient's life.

## CASE NO. 30

This patient was a 33 year old white multipara, para 3 with 3 living children whose previous obstetrical history was entirely normal. She had had three normal vaginal deliveries. With the present pregnancy she had had no prenatal care and was admitted to the hospital on September 27 being at that time two weeks past her estimated date of confinement. Admission examination revealed the blood pressure to be 140/85, the urine to contain a 2-plus albumin, no sugar, the hemoglobin to be 75%, the heart and lungs normal, the fetal heart in the right lower quadrant, and the fetal head not engaged in the pelvis. The patient was very obese but her exact weight was not determined. Immediate induction of labor was thought indicated, and accordingly the patient was given castor oil followed by 5 grains of quinine and then pituitrin 2 minims every 2 hours for four doses. These measures failed to initiate labor. A flat plate of the abdomen was then taken which revealed a "very large baby" presenting by the vertex with the head not in the pelvis.

The patient had previously been hospitalized in a mental institution and had been released approximately ten months prior to her present hospitalization. Following the failure of the attempts to induce labor it was decided to deliver the patient by Cesarean section, and to perform sterilization because of her previous mental disorder. At operation classical cesarean section was performed with the delivery of a living male infant. Profuse hemorrhage was encountered from several large venous sinuses and one cc. of pituitrin was injected into the body of the uterus following delivery of the placenta. The uterine incision was closed in three layers and tubal sterilization carried out. At this point it was noted that the uterus was still very soft but that the patient's general condition was excellent. A second c.c. of pituitrin was injected into the uterine musculature and the uterus contracted and was firm. The abdomen was then closed and the operator left the operating room. Upon transferring the patient from the operating table to a stretcher it was found that she was lying in a pool of blood and shortly thereafter she went into profound shock. She was given coramine, caffeine sodium benzoate, and a transfusion of 500 c.c. of citrated blood was begun. After receiving artificial respiration for ten minutes, the patient was pronounced dead.

*Discussion:* This death was considered by the committee to be preventable on the basis of there having been no indication for the performance of cesarean section. It would seem from the history that the desire to carry out tubal ligation on this patient was the determining factor in reaching the decision to deliver her abdominally. Seeking an opportunity to perform sterilization, however, it *not* an indication for cesarean section. Another possible reason for performing cesarean section here might have been cephalo-pelvic disproportion, but no pelvic measurements were made and the fact that a "very large child" was reported from a flat plate of the abdomen should be discounted, since estimations of fetal size by this method are notably unreliable and misleading. The borderline hypertension and 2-plus albuminuria did not indicate a sufficiently severe process to warrant abdominal delivery, nor did the fact that the patient was two weeks past term. Consequently the committee was at a loss to find a justifiable indication for the method of delivery employed in this case. Having been subjected to an unnecessary cesarean section, the patient could still have survived had the treatment of the uterine atony been on a sounder basis. There is nothing to be gained by injection of oxytocic drugs directly into the uterus. These drugs act by being absorbed into the general circulation and then stimulating the nerve supply to the uterus. A much more efficient method of treating the uterine atony, therefore, would have been the intravenous administration of either an ergot preparation or pitocin.

## CASE NO. 31

The patient was a 33 year old white multipara whose estimated date of confinement was October 1, who was admitted to the hospital on September 13. Her past and personal history were non-contributory and the present pregnancy had progressed normally until the day of admission, except for several episodes of slight vaginal spotting during the month prior to admission. On the day of admission in the late morning the patient had a sudden profuse vaginal hemorrhage without pain. She was seen at home by her physician who packed the vagina and transferred the patient immediately to the hospital.

Upon admission to the hospital at 1:00 P.M. the patient's general condition was satisfactory. The vaginal pack was removed and on vaginal examination the cervix was found to be closed. There was continued vaginal hemorrhage of moderate degree and the vagina was packed once again. The patient bled through this pack and accordingly a third physician was called approximately two hours after the patient's admission to the hospital. The intravenous administration of plasma and glucose was begun and under open ether anaesthesia a classical cesarean section was performed with the delivery of a stillborn infant. At operation the patient was found to have a placenta praevia. Post-operatively the administration of glucose and plasma by vein was continued while efforts were made to obtain and cross match donors. She received one transfusion of 500 c.c. of whole blood shortly before her death which took place seven hours after her admission to the hospital.

*Discussion:* The information pertaining to this patient is obviously very meager and there are many additional facts one would like to know, but the committee felt that there was sufficient information to class this as a preventable death. This patient's history illustrates the utter futility of packing the vagina in cases of placenta praevia. The insertion of a pack may conceal the amount of external bleeding for a time and give the attending physician a false sense of security, but eventually, as in this case, bleeding through the pack occurs. In addition, packing the vagina is an excellent method of introducing infection, making further operative procedures more hazardous. The time spent in packing the vagina in this case would have been much more profitably spent in efforts to combat shock and obtain donors. Secondly, this patient had had several episodes of vaginal spotting, the significance of which was overlooked either by the patient or by her physician. Every case of painless vaginal bleeding in the last third of pregnancy warrants immediate investigation. Lastly, this death is another of those in which the non-availability of blood for immediate transfusion plays such an important role.

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# *Gynecology*

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## ENDOCRINOLOGY

### THE EFFECT OF THIOURACIL HYPOTHYROIDISM ON REPRODUCTION IN THE RAT

G. E. S. JONES, E. DELFS AND E. C. FOOTE

Endocrinology, 38: 337-344, 1946

Using thiouracil to produce hypothyroidism in the rat, the relationship between thyroid activity and reproduction has been studied.

A group of 14 male adult rats was fed a 0.1 per cent solution of thiouracil (24 mgm. per day, per rat) and then mated after 49, 166, 204 and 259 days of thiouracil ingestion. All of the rats except 4 were able to sire normal litters. Three rats, obviously ill, died; one of diffuse lymphosarcoma, and 2 of unknown causes. One mating was unsuccessful. There was a tendency toward unsuccessful matings following the 166th day of thiouracil administration in this group of male rats. This probably reflects the toxicity of the drug rather than any impairment in reproductive capacities. At autopsy, all rats showed a marked increase in thyroid weight, and microscopically the thyroid was hyperplastic. The authors conclude that thiouracil hypothyroidism has no effect on the reproductive system of the adult male rat as judged by its ability to sire litters.

A group of 15 female rats, 6 months old, was given a 0.1 per cent solution of thiouracil (20 mgm. per day, per rat) and mated at various intervals from 84 to 202 days after ingestion. Five litters resulted from the first group of 9 matings made 84 days after the ingestion of thiouracil. All other matings (22) terminated in resorption of the fetuses. This experiment showed that prolonged thiouracil administration (over 100 days) associated with hypothyroidism in the adult female rat does not cause sterility, but does interfere with continuation of gestation, causing resorption of embryos in 100 per cent of the cases.

If the results of these studies represent the effect of hypothyroidism on the reproductive system, they indicate that hypothyroidism has no effect on gametogenesis in the rat, but that it does have a marked effect upon the continuation of gestation, producing resorption in mid or late pregnancy.

## DIETHYLSTILBESTROL IN AQUEOUS SUSPENSION

S. C. FREED

J. Clin. Endocrinol., 6: 420-422, 1946

The author, with Greenhill, has previously reported the employment of injections of estrone crystals in aqueous suspension in order to eliminate allergic reactions. The experiments have been extended to diethylstilbestrol. The usefulness of this potent and inexpensive synthetic estrogen is curtailed because it induces a relatively high incidence of side reactions, such as nausea, vomiting, dizziness, etc. The author has shown that these side reactions are due to rapid absorption into the blood stream, resulting in physiologic tissue changes similar to those occurring in early pregnancy. If an aqueous suspension of diethylstilbestrol has a slower absorption than that dissolved in oil, there would then follow a decrease in toxicity, improved therapeutic action and freedom from allergic reaction to the oil vehicle.

Menopausal women with typical, moderate to severe symptoms received by injection diethylstilbestrol suspended in water. Injections were given every 2 weeks, in doses of 2.5 mg. and 5 mg. One hundred and one women received the former dosage, and of these, 36 obtained excellent relief, 64 moderate relief, 6 slight relief and 5 no relief. Of 53 patients receiving 5 mg. doses, 28 obtained excellent relief, 20 moderate relief, 3 slight relief and 2 no relief. Four patients of the 101 receiving 2.5 mg. dosage and 2 of the 53 patients receiving 5 mg. dosage complained of nausea for from one to 2 days. This incidence of toxicity is considerably less than that demonstrated by patients who were given diethylstilbestrol in oil, as illustrated by the fact that 15 out of 32 patients who received 5 mg. of diethylstilbestrol in oil developed severe nausea, vomiting, etc.

While no claim is made as to the greater potency of the material in aqueous suspension, the fact that there is an increased effectiveness wherever this material is treated to delay its absorption, suggest that its potency might be appreciably increased. The preparation possesses the further advantage of being free from substances that induce local allergic reactions, encountered with oil solutions.

(Everyone will agree that the employment of diethylstilbestrol is shamefully abused, and everyone will agree that it possesses the disadvantage of producing unpleasant though not harmful toxic effects in a small proportion of women, in my own experience not more than 10 to 15 per cent. And yet it is effective, inexpensive, and when properly employed, entirely safe, so that it can be considered to be a boon for women in need of estrogen therapy, especially in the minority of menopausal cases in which such treatment is called for. In my own practice, I am likely to select oral stilbestrol as the means of applying estrogen therapy. Should the patient not be able to take it, any one of a considerable group of other and less toxic oral estrogenic preparations are available. I rarely resort to hypodermic therapy for menopausal symptoms, and use it *relatively infrequently for other indications*. For those who prefer hypodermic stilbestrol therapy, although I do not see why they should, the aqueous suspension suggested by Freed may have some advantages. I wonder if the author's statement, referring to *stilbestrol*, that the high incidence of unpleasant reactions is due to its rapid absorption into the blood stream, and that these toxic

symptoms are the result of physiologic changes in the tissue, much like those which occur in early pregnancy, may be considered as clearly established.—Ed.)

## THERAPEUTIC USE OF TESTOSTERONE IN AQUEOUS SUSPENSION

S. C. FREED

J. Clin. Endocrinol., 6: 571-574, 1946

The author has demonstrated previously that the suspension of estrone crystals in water is effective for estrogen therapy, giving freedom from possible allergic reactions to the customary oil vehicle. Likewise, satisfactory results have been reported with aqueous suspensions of diethylstilbestrol. Experiments have therefore been extended with aqueous suspensions of testosterone.

In the present study, groups of women with premenstrual distress of significant degree were given the following preparations on about the seventh day before the expected onset of the menses: 20 mg. of testosterone crystals suspended in water; 25 mg. and 10 mg. of testosterone propionate in oil; and a placebo. It was found that testosterone in aqueous suspension is at least half as potent as testosterone propionate in oil; 20 mg. of testosterone propionate in aqueous suspension or 10 mg. of testosterone propionate in oil are highly effective in controlling premenstrual distress. In view of the fact that testosterone in aqueous suspension is free from the local allergic reactions produced by an oil vehicle, there is a definite need for such a preparation in the endocrine armamentarium.

## A STUDY OF PROGESTERONE INACTIVATION BY THE LIVER AFTER INTRAPORTAL ADMINISTRATION

PAUL ENGEL

Endocrinology, 38: 215-217, 1946

Progesterone in microcrystals was injected into infantile female rabbits in the Clauberg test by the subcutaneous route in 9 animals and by injection directly into the portal vein in 10 animals. The animals treated with 2, 3 or 5 mg. of progesterone all showed progestational transformation of the endometrium, regardless of the route of administration. The animals treated with 0.5 mg. intraportally were negative, but rabbits treated with 0.5 or one mg. of progesterone by subcutaneous injection developed positive reactions. The author concludes that some inactivating power of the liver on progesterone seems therefore to exist, but that much less inactivation by the liver occurs than with other sex hormones *in vivo*.

(See comment on following abstract.—Ed.)



ADMINISTRATION OF PROGESTERONE IN THE FORM  
OF MICROCRYSTALS

O. KOREF AND P. ENGEL

Endocrinology, 38: 214-215, 1946

An aqueous emulsion of microcrystals of progesterone was used for the present experiments, in a concentration of 4.5 mg. of progesterone in 1 cc. This emulsion was tested on infantile female rabbits, pretreated for 8 days with 10 I.U. of estrone daily (Clausberg test). Single subcutaneous injections were given in amounts ranging from 0.5 to 10 mg. of progesterone. The results were compared with the activity of solutions of pure crystalline progesterone in oil, ranging from 1 to 10 mg., applied in single and in divided doses. Biopsies of the uteri were made 5 and 10 days after the first, or single injection of progesterone.

The rabbits injected with 1 mg. of progesterone in oil, divided into 5 doses showed complete progestational transformation of the uterine mucosa the day after the last injection. Five days later the uterus had completely regressed. Single injections of 1 mg. of progesterone in oil were followed by no reaction in the uterine mucosa. After a single injection of 2 or 10 mg., a clear progestational transformation of the endometrium was obtained, but this regressed 10 days after the injection.

With microcrystals, the authors found that 0.5 mg. produced full development of the progestational uterine mucosa. One, 5 and 10 mg. were followed by the same effect. Ten days after the injection, the rabbits injected with one mg. of microcrystals showed a negative uterine test; those which received 5 and 10 mg. had a still markedly positive progestational uterine mucosa.

It is concluded that 0.5 mg. of progesterone in the form of microcrystals has at least as much effect on the rabbit uterus in the Clausberg test as does one mg. in oily solution given in 5 fractionated doses, and as much activity as 2 mg. in oil in a single injection. Furthermore, there is a prolongation of the progesterone effect when microcrystals are employed. This form of treatment could be of value in instances where a prolonged progestational effect is required, as in habitual abortion.

(Apparently progesterone, like estrogen, is destroyed in the liver. The employment of an aqueous emulsion of progesterone microcrystals is recommended by the authors apparently because of its slower absorption and more prolonged effect than that of progesterone in oil. The same principle, it will be recalled, was urged by Greenhill and Freed in their advocacy of aqueous preparations of estrogen. There does not, however, appear to have been any extensive adoption of this plan, perhaps in part because of the growing popularity of oral estrogenic therapy. It is to be doubted whether the suggestion of Koref and Engel will evoke any widespread response among clinicians.—Ed.)

## THE MENSTRUAL CYCLE

### ENDOMETRIAL VASCULAR REACTIONS AND THE MECHANISM OF NIDATION

DORIS HAWKINS PHELPS

Am. J. Anat., 79: 167-197, September, 1946

In studies on the mechanism of abnormal uterine bleeding, ovariectomized rhesus monkeys were injected with ovarian hormones. Vascular phenomena were studied by means of intraovular endometrial transplants. With certain combinations of estrogen and progesterone, the changes in the coiled arteries which characterize the normal ovulatory cycle were reproduced. Arterial growth and synchronous changes in the distribution of the extra-cellular fluid resulted in a close approximation of arteries and endometrial surface at the stage of the experiment corresponding to the time of nidation. A characteristic type of vascular development was observed during the period of progesterone administration, distinctive features being looping, curling and anastomosis of terminal branches, and sudden spurts of growth at the stage of the experiment corresponding to the time of nidation. In control experiments with estrogen, the changes in the coiled arteries simulated those characteristic of the anovulatory cycle and the close approximation of arteries and surface obtained with estrogen-progesterone was not obtained with estrogen alone. The results afford evidence that the changes in the coiled arteries which characterize the postovulatory phase of the cycle in the endometrium involve a response to a specific action of progesterone—direct or indirect—upon the endometrial arteries and support the view that the essential action of progesterone, without which nidation cannot take place, is wholly or in part its action upon the endometrial vascular bed.

### PROFUSE OR IRREGULAR MENSTRUAL PERIODS IN YOUNG WOMEN: A PRACTICAL PROGRAMME OF TREATMENT

ALAN GRANT

M. J. Australia, 2: 113-116, 1946

The observations recorded by the author are based on experience in the treatment of over 150 consecutive patients, members of the women's services, suffering from functional uterine hemorrhage. The menstrual disturbances discussed are of the type usually known as functional uterine hemorrhage, or functional menorrhagia and metrorrhagia, the etiology of which is a disorder of the pituitary-

ovarian mechanism. In such cases no organic disease can be demonstrated, and the bleeding is not due to general or local disease.

In examining these patients a hemoglobin estimation was made routinely, to serve as a criterion of the real severity of blood loss. Physical examination included a general one to exclude diseases such as blood dyscrasias, hypothyroidism, hypertension, etc., as well as a pelvic one, with visualization of the cervix. The criteria adopted for the designation of a case as one of functional hemorrhage were as follows: (1) hemoglobin value must be 80 per cent or less; (2) menstrual periods must last longer than 7 days; or (3) periods must occur at intervals of less than 21 days; (4) diagnosis must be supported by diagnostic curettage. In the present series of cases, 66 per cent of patients showed evidence of a proliferative or hyperplastic endometrium, and an additional 22 per cent showed abnormalities such as irregular ripening of the endometrium, hyposecretory changes or atrophy. Diagnostic curettage is essential to exclude a small polypus, tuberculous endometritis, carcinoma, etc.

The author has found that the curettage that is performed primarily as a diagnostic procedure will often prove to be also therapeutic. This method has long been known, but recently has been submerged under a flood of enthusiasm for endocrine preparations. If the condition recurs after curettage, the writer recommends cyclic substitution therapy compressed into 10 days, using synthetic estrogens and progesterone.

In some cases of endocrine hemorrhage in young women, blood loss may be severe enough to cause collapse. In the emergency treatment of functional uterine hemorrhage curettage is the most prompt and effective measure. Many authors, especially Karnacky, recommend the intramuscular injection of a large dose of estrogen into the cervix or *vastus lateralis*, but in the author's experience it lessened the hemorrhage over a period of days and, as speed was important, he abandoned this method.

Three case reports are presented, and the various modes of treatment, other than that found most effective by the author, are discussed.

(The criteria adopted by the author for functional hemorrhagia can scarcely be considered reliable. For example, there are many women with hemoglobin values of 80 per cent or less whose menstrual bleeding is of normal amount, or even scanty. Again, many women may lose far more blood in 5 or 6 days than others in 8 or 10. For that matter it is not rare to see women who throughout life have always menstruated 7 days or more, and yet with no excess of amount and no anemia.)

The author, like most of us, has found that curettage is not infrequently corrective of the bleeding, although I wish he or someone else could explain just how removal of the uterine mucosa brings about the readjustment of ovarian and pituitary function which apparently takes place, and with sufficient frequency to make one doubtful of the factor of mere coincidence. There has long been speculation as to whether the endometrium elaborates an internal secretion, but certainly none has been demonstrated. Everyone feels that some sort of coordination exists between the ovary and the endometrium, other than the direct histological changes produced in the latter by the ovarian hormones. A good example of what I mean is seen in the fact that even if both ovaries are conserved when hysterectomy is done, a woman may still have some vasomotor symptoms, though almost always much milder than after removal of the ovaries. How can we explain this, except on the basis of some sort of physiological and perhaps endocrine coordination?

Even when one is reasonably sure of the functional nature of bleeding, I believe that curettage is usually advisable, when the bleeding has been free and long continued, before beginning any organotherapy. Aside from the possibly corrective value of such a procedure, and its even more frequent advantages for the immediate improvement of the patient, one has the endometrium for microscopic study, and this may influence the form of endocrine therapy to be employed.—Ed.)

## A STUDY OF NORMAL AND ABNORMAL MENSTRUAL FUNCTION IN THE AUXILIARY TERRITORIAL SERVICE

CECIL MARY DRILLIEN

J. Obst. & Gynaec. Brit. Emp., 53: 228-241, 1946

The present study was made in order to obtain data regarding normal menstrual function in young women and the incidence of dysmenorrhea and its relation to social and personal background, and also to ascertain whether service in the Auxiliary Territorial Service has any significant effect on menstrual rhythm, and whether there is any correlation between such disturbance and social or personal factors. Over 700 women from all branches of the Service were interviewed, and the conclusions which were reached are summarized below.

*Dysmenorrhea:* Nearly 50 per cent of the women did not admit having symptoms at menstruation. In only 23 per cent was there any interference with normal routine. It was apparent that the incidence of dysmenorrhea rose until the early 20's, and then fell off. Significant was the high incidence of symptom-free individuals over 27 years of age.

A high standard of physique and general health was associated with freedom from symptoms, while anxiety resulting from nature of employment appeared to aggravate dysmenorrhea. No striking difference was noted between the incidence of dysmenorrhea among officers and other ranks. Inconclusive results were also found in comparing intelligence grades. It is popularly supposed that only children are more liable to dysmenorrhea than those brought up with brothers and sisters, but only children in this series seemed to be less liable to dysmenorrhea; this was statistically insignificant in those who had been in the Army over 3 months, but significant in those recently enlisted.

An increase in dysmenorrhea was observed in those having a protracted period and profuse flow.

*Irregularity of cycle:* Sixteen per cent of the series gave a history of irregularity. Like dysmenorrhea, irregularity was highest in the early 20's, falling off in subsequent age groups. A highly significant excess of dysmenorrhea was found among those women having irregular cycles.

*Menstrual disorders at entry to the A.T.S.:* Over 25 per cent of the auxiliaries gave a history of one or more missed periods at entry to the A.T.S. Eleven per cent suffered from some other disturbance. As with dysmenorrhea and ir-

regularity, the incidence of amenorrhea was highest in the early 20's. Girls who entered the A.T.S. in their teens, or when over 24 years of age, had a significantly lower incidence of amenorrhea. There was a higher incidence of amenorrhea at entry in only children, but this was not significant.

The rate for amenorrhea among officers was only about  $\frac{1}{12}$  that found in other ranks, although all officers interviewed had previously served in the ranks. The author suggests that this large difference can be accounted for by the fact that many officers had previously been away from home at boarding school, university, or in jobs, and therefore the transition to a communal life involved less emotional stress in their case. 5 figures.

(This study of a fairly large series of young women in a rather selected group brings out a number of interesting observations. The author states that 50 per cent had little or no discomfort, and that in only 23 per cent was there interference with normal routine, meaning presumably that this latter group required at least some bed rest. This figure seems to be pretty high, much higher than would be expected in a similar group of civilian females.

It is also of interest to note that only children, meaning those with no siblings, were less liable to dysmenorrhea than others, and perhaps contrary to what one might expect, especially if a psychogenic factor is envisaged in the explanation of primary dysmenorrhea. —Ed.)

## A CASE OF PRIMARY AMENORRHEA

GRETE STOHR

J. Clin. Endocrinol., 6: 426-433, 1946

A 22 year old patient presented herself with the chief complaint of never having menstruated. Her past and family histories were unessential. The patient appeared younger than her age, with pleasant feminine features. There was pronounced obesity of waist and hips. The fingers did not show marked tapering. The breasts were flat cushion-like elevations and the mamillae were not developed. There was no pubic hair and the external genitalia were greatly underdeveloped. The uterus was small, in normal position, and the corpus-cervix ratio was of adult type. A diagnosis of hypo-ovarianism with hypo-genitalism and primary amenorrhea was made and substitutional therapy instituted in 4 phases.

In the first phase of treatment, implantation of 72 mg. of estrone resulted in gradual mammary growth and in the appearance of pubic hair. No obvious development of genitalia occurred in 3 months. No bleeding episodes resulted, but the patient's emotional life exhibited marked changes toward active dream-life focussed on sexual motives. Endometrial tissue could not be obtained by biopsy.

The second phase of treatment consisted of cyclic therapy with estrogenic

and progestogenic hormones intramuscularly. This resulted in proliferation and secretory changes in the endometrial mucosa. Bleeding occurred repeatedly, but could not be produced from a progestational endometrium unless the optimal quantitative estrogen-progesterone relation was established.

The third phase of treatment consisted of oral medication. A minimum of from 750 to 1000 mg. of pregnenolone was required to obtain secretory activity after adequate priming with estradiol.

During the following years of the fourth phase of treatment therapy was of necessity irregular, and the results as evidenced by endometrial biopsies reflected exactly the amounts and types of hormones administered. The patient, now 27, reports sporadically to the clinic, able to maintain physical and mental equilibrium by periodic estrogenic intake. Female characteristics remain well developed, and bleeding occurs from 2 to 3 times a year. 6 figures.

(This case report is of interest chiefly because the substitutional therapy described in the paper brought about striking improvement in the development of certain secondary sex characteristics, especially growth of mammary tissue and of pubic hair. This, however, is not by any means always the case. For example, there are many patients with underdeveloped breasts, with or without amenorrhea, in whom estrogen therapy is ineffective, the breast tissue being apparently refractory to estrogen influence, for some unknown and probably congenital or chromosomal reason. Again, in many cases of primary amenorrhea the breasts may be entirely normal in development, so that all gradations and types of cases are seen under the general category of primary amenorrhea. In a large proportion of them, as in this case, adequate substitutional estrogen therapy will bring about bleeding, and when combined with progesterone in sufficient dosage, a typical menstrual histological cycle can be brought about in the uterus. The unfortunate feature, however, is that such treatment does not start the ovarian machinery, so that only rarely do patients go along under their own steam, so to speak, after the endocrine therapy is stopped.—Ed.)

### AMENORRHOEA AT STANLEY CAMP, HONG KONG, DURING INTERNMENT

ANNIE SYDENHAM

Brit. M. J., 2: 159, 1946

During the internment of British civilian subjects in Stanley Camp after the fall of Hong Kong in 1941, it was found that of 436 women between the ages of 15 and 45 years only 34.86 per cent had regular menstruation; 4.59 per cent were irregular, with menorrhagia, and 60.55 per cent had amenorrhea (53.67 per cent with amenorrhea for more than 3 months).

The most common symptom was excessive weight gain; although the chief reason for this was probably the unaccustomed excessive rice diet, it was thought that thyroid deficiency might be an additional factor. In other patients the chief symptoms were nervousness and depression at the time when the period

would normally be due. The group of patients who gained excessive weight was given thyroid extract and the group with nervous symptoms was given menformon injections, but owing to the limited supply of drugs and inadequate facilities for investigation, the results were inconclusive.

Within 6 months 81 women had resumed menstruation, and within 18 months menstruation was re-established in all but 6 cases which persisted throughout the period of internment.

The emotional shock of war and internment, with the change of environment and occupation was probably the initial cause of the amenorrhea. The author suggests that undernourishment, especially protein deficiency, and possibly vitamin deficiency, may have been an additional factor.

(During and after World War I there were numerous reports, especially in the German literature, of the widespread "war amenorrhea" (Krieg's amenorrhöe) among women in the belligerent countries, and this phenomenon was commonly explained by the nutritional deprivation prevalent throughout these countries. During World War II at least two studies in this general field appeared. The first was that of Loeser (*Lancet*, 1: 518, 1943) who described the frequent amenorrhea among the women of London during the period of German bombings, and explained this on the basis of hormone arrest by emotional factors.

I recall that at that time he sent me a considerable number of sections of the endometria of such women obtained at considerable periods after the menstrual arrest, and with no clinical data whatsoever, his request being simply that I put down an approximate estimate of the cycle day to which I thought such endometria corresponded. In his paper, when published, his thesis was that the cycle of these women was abruptly arrested by emotional factors, usually fright, occurring on almost exactly the day of the cycle to which I had assigned the endometria.

The study of Whitacre and Barrera on the amenorrhea of American internee women during the Japanese occupation of the Phillipines likewise stressed the importance of emotional rather than nutritional factors.

The above abstracted paper of Sydenham again emphasizes the high incidence of amenorrhea under the conditions of war internment, and the author, like those quoted above, looks upon emotional shock as the initial cause of the amenorrhea. However, she suggests that undernutrition may have been an additional factor, and this, to me at least, appears likely. The ovaries, as a matter of fact, seem to be quite sensitive to nutritional deficiency, as illustrated by the amenorrhea so often seen in constitutional diseases characterized by marked debility.

Again, I have observed the occurrence of amenorrhea in young women after extreme dieting for weight reduction, and laboratory investigators have been able to abolish estrous cycles in animals simply by the withdrawal of certain essential vitamins from the diet. There can be no doubt that powerful emotional factors, such as fright, can temporarily arrest ovarian function, either directly or through the medium of the pituitary, but there seems just as little doubt that nutritional and probably especially vitamin deficiencies, can likewise produce amenorrhea.—Ed.)

## VULVA AND VAGINA

### MELANOMA OF THE VULVA WITH PREGNANCY

S. G. CLAYTON

Proc. Roy. Soc. Med., 39: 578-579, 1946

A 27 year old primigravida, 8 weeks pregnant, complained of a swelling on the right labium majus, which had been present without alteration for many years. A pedunculated swelling was found, firm in consistency and without pigmentation. Inguinal glands were not enlarged. The tumor was diagnosed as pedunculated fibroma, and was excised with a fair margin of normal skin. Section unexpectedly revealed melanoma, consisting chiefly of spindle cells, with very little pigment, and not appearing very active. In view of this, and the long history of the tumor, inguinal dissection was not performed and radiation was not used because of the pregnancy.

Two years later she was admitted with an enlarged right inguinal gland. Liver and spleen were not palpable and chest x-ray was clear. Bilateral inguinal dissection was carried out and deep x-ray therapy was directed at the pelvis and inguinal regions. Section showed that 2 glands contained tumor cells similar to those of the primary lesion, but with pigment even less evident. About a year and a half later a nodule appeared in the breast; biopsy proved this to be of the same nature. Further deposits appeared in liver and bones, and the patient died in 2 months.

The author admits that the full menace of this apparently relatively benign and long-standing tumor was not at first realized, and strongly emphasizes the danger of all such tumors, particularly in pregnancy.

(Melanoma is now looked upon as an epithelial type of tumor, so that the former designation of melanosarcoma has been given up in favor of that of melanoma. The interesting feature of Clayton's case is that the original tumor gave no clinical suggestion of pigmentation, whereas most melanomas appear to have originated in obviously pigmented moles. The fact that inguinal adenectomy and radiation were not performed probably was not of decisive importance, as these tumors are practically always fatal anyhow. Fortunately they are exceedingly rare in the vulva, so that most gynecologists have probably encountered no such cases.—Ed.)

### CASE OF LYMPHOGRANULOMA VENEREUM (PORADENO- LYMPHITIS) IN A WHITE FEMALE

W. J. COLE AND T. C. JEWELL

Canad. M.A.J., 55: 379-381, 1946

A proved case of lymphogranuloma venereum occurring in Canada is presented by the authors. The patient, a white 20 year old female, was admitted to the



gynecological service complaining of non-painful swelling in each groin, of about 3 weeks' duration. The lymph glands on the left side were enlarged and matted due to a marked amount of perilymphadenitis, and there were many confluent areas of gland destruction with demonstrable fluctuation. The inguinal glands on the right side were involved to a lesser extent. An ulcer on the left labium minor was negative for *treponema pallidum* on darkfield examination; lymph node punctures of the inguinal glands were similarly negative.

Serologic tests for syphilis were repeatedly negative. Pus aspirated from the left inguinal region was cultured with no growth. Mice and living chick embryo were inoculated intracerebrally, and in both instances a pure culture of the virus lymphogranuloma venereum was isolated. The Frei test was positive.

The patient was treated conservatively with 50 gm. of sulfathiazole, and an apparent cure was obtained after 22 days' hospitalization. The albumin-globulin ratio has reverted from 4.59 and 3.51 per cent, respectively (during hospital stay), to 5.2 and 2.9 per cent, respectively, about 4 months later.

It was revealed that the patient had had sexual relations with a soldier, recently returned from Italy, who at the time was hospitalized for penile ulcers and inguinal adenopathy. A Frei test on this soldier was positive. 1 figure.

(This otherwise typical case is reported presumably because it occurred as far north as Canada. While sporadic cases are encountered in the northern cities, it is in the South that its heavy incidence is seen. (Senator Claghorn please note!)—Ed.)

## RUPTURE OF THE POSTERIOR VAGINA DURING NORMAL COITUS

R. B. NICHOLLS

*Am. J. Obst. & Gynec.*, 52: 500, 1946

The author reports a case of an unusual vaginal injury as the result of normal coitus. The patient was reunited with her husband after 6 months' separation, and the couple had intercourse in the late afternoon and again in the early evening. Nothing unusual was experienced by either husband or wife. Ten minutes after intercourse the patient noticed a dull ache in her lower abdomen, followed by excessive vaginal bleeding. When admitted to the hospital she was in mild shock; vaginal examination revealed laceration of the right posterior wall. The vagina was packed and the patient was given a blood transfusion. At operation a 2-inch laceration was noted extending through the entire vaginal wall in the right fornix. The laceration had severed a small branch of the uterine artery near the cervix. The peritoneum had not been penetrated.

The area was cleared of clots, the artery was suture ligated and the laceration closed after filling it with sulfanilamide powder. Recovery was uneventful.

(All sorts of coital injuries, sometimes of rather incredible nature, have been reported, especially in the German literature. As for the minor ones, the most frequent is troublesome bleeding from laceration of the hymen, and many a honeymoon has been unromantically spoiled by the necessity of controlling such bleeding by suture. The honeymoon is not always merely a compound of love, moonlight and roses. While coital injuries are most often seen in newly-weds, this is not always so, as illustrated in the case reported by Nicholls.—Ed.)

## THE UTERUS

### A SEVEN-YEAR HISTORY IN EARLY CERVICAL CANCER

H. C. TAYLOR, JR., AND H. B. GUYER

Am. J. Obst. & Gynec., 52: 451-455, 1946

The patient who is the subject of this report was 50 years old, with an irrelevant history, except for one full-term pregnancy and a spontaneous abortion. At the age of 37 years she discovered a lump in her breast, radical mastectomy was performed, and the pathologic report was carcinoma of the breast. Post-operative x-ray was given, including x-rays to the pelvis for suppression of ovarian function.

About 6 years after the mastectomy a vaginal examination revealed the uterus to be enlarged and irregular in shape, and a small erosion on the right side of the cervix. A biopsy was taken which was diagnosed as "epithelioma—transitional cell type" by one pathologist. Another pathologist did not consider sufficient tissue present to justify a diagnosis of carcinoma, and another biopsy was reported as chronic cervicitis. A supracervical hysterectomy and bilateral salpingo-oophorectomy were performed and the pathologic report from the material obtained was multiple fibroids of the uterus.

Following operation the patient returned every 6 months, but repeated speculum examinations showed an apparently normal cervix. Seven years after the original cervical biopsy a proliferating nodular erosion of the cervix was seen. Biopsy showed squamous cell carcinoma with invasion. Radiation therapy was immediately begun. The original slides obtained 7 years previously were reviewed, and it was now agreed that there was sufficient variation in size, shape and staining properties of the squamous cells to justify a diagnosis of carcinoma. The cell changes were confined to the epithelium. The specimen was completely sectioned, and in several slides there were small invasive tongues of abnormal squamous cells extending into the fibrous stroma.

The most striking feature in this case is the long time which may elapse between the origin of the early lesion in its microscopic form and the possibility of clinical recognition. It appears that cervical cancer may be latent for years; later the growth accelerates and the cancer becomes infiltrated. There is disagreement as to whether a lesion may be called carcinoma when confined to the epithelium; some believe that such lesions are precursors of carcinoma. The present case is evidence in favor of complete as opposed to supravaginal hysterectomy whenever the cervix is at all abnormal. The authors conclude that this case also illustrates the need of constant care in all medical phases if cancer of the cervix is to be detected early, and of meticulous laboratory work. 3 figures.

(This case is of interest, first of all, because it is another instance of multiple cancer, since the patient had had a cancer of the breast at the age of 37, and many years later de-

veloped a different type of cancer in another organ, the cervix uteri (see abstract of paper by Siegler and Silverstein, on Multiple Primary Carcinomas, in this issue of the Survey). The chief interest of this case, however, lies in the fact that a lesion of the cervix, later diagnosed as definitely cancerous, had persisted in a latent sub-clinical form for 7 years, even though the patient was under close scrutiny throughout this time. One gets the impression, however, that the picture in 1938 was that of so-called preinvasive carcinoma, although the authors state that several small invasive tongues were noted in the original section. In either case the observation is of interest. If actual invasiveness had already developed in 1938, it would seem remarkable that the lesion had remained virtually stationary for 7 years.

On the other hand, it would not be so surprising, in the light of similar reports of recent years, to find that a preinvasive carcinoma would show a lag of many years before the development of the histological invasiveness which stamps the lesion as definitely malignant from a clinical standpoint. Such a sequence has been reported by a number of previous authors, quoted by the writers of the present paper, but the total number of reported instances of this type is still extremely small, so that the exact histologic significance of preinvasive carcinoma has been a controversial question.

As a matter of fact, preinvasive carcinoma itself is a rare finding if the histologic study of any such case is complete. It is true that the lesion is relatively common in individual biopsy sections as they come to the laboratory. But in the vast majority of these cases, serial studies, with often repetitions of the biopsy, show that somewhere in the very close vicinity of the preinvasive lesion actual invasiveness is demonstrable. This has been the experience in our own laboratory, as was well shown in the recent study of TeLinde and Galvin (*Am. J. Obst. & Gynec.*, 48: 774, 1944).

On the other hand, there is in the literature a still very small group of cases in which even such meticulous study as was above emphasized shows no evidence of invasiveness, so that the designation of preinvasive carcinoma or intraepithelial carcinoma, or carcinoma in situ seems justified. Moreover, the follow-up studies of this small group have shown that the lesion may remain in this preinvasive and therefore clinically non-malignant phase for many years. As a matter of fact, it would appear that invasiveness may never be developed within the lifetime of the individual (Stevenson and Scipiadès, *Surg., Gynec. & Obst.*, 66: 822, 1938). However, it must again be emphasized that genuinely pre-invasive carcinoma is a far less frequent finding than that of "preinvasive" areas in what is already genuinely carcinoma.

On the basis of what we know thus far, it seems that carcinoma develops in two chief steps. The first is the development of histologically typical cancer characteristics in the epithelium itself. This is followed by a latent period of variable length, though it may be exceedingly long, after which the second and more decisive step develops, that of invasiveness and lymphatic permeation. It is this latter which makes the lesion clinically malignant, while in the first stage, when the epithelial cells are still sharply confined by the basement membrane, the lesion must still be considered a clinically benign one.

What should our policy be when presented with a pathological report of preinvasive cancer? Not many mistakes would be made if the treatment chosen were that of definite cancer, which can usually be actually demonstrated by further and more complete study. The latter is always advisable, as one likes to clinch the diagnosis, if possible, in view of the importance to the patient of the proper decision.

One other point seems worthy of emphasis. Under preinvasive carcinoma one has no right to include cases of moderate so-called hyperactivity of the epithelium, as manifested by thickening of the basal layers, the finding of a few mitoses, etc. In genuine intraepithelial carcinoma the stratification of the epithelial layers is completely lost, and its complete thickness consists of cells identical in their characteristics with those of ordinary invasive carcinoma. The milder degrees of "hyperactivity" may well be due to inflammatory or hormonal factors, and, like the more moderate degrees of leukoplakia, a relationship to cancer has not been demonstrated.—Ed.)

## MULTIPLE PRIMARY CARCINOMAS

S. L. SIEGLER AND L. M. SILVERSTEIN

Am. J. Obst. &amp; Gynec., 52: 474-477, 1946

The authors emphasize that the immunity theory for primary carcinomas is to be disregarded, and that physicians should be more conscious of the appearance of new primary carcinomas in patients who have already been susceptible to one. The incidence of multiple primary carcinomas has increased from 0.3 per cent to 3.7 per cent (Warren and Gates, 1932) to 6.8 per cent (Warren and Ehrenreich, 1944) of all carcinomas, both in surgical and autopsy material. The case presented in this paper is of interest because of a 4½-year interval between carcinomas, and because of apparent cure of both malignancies in an elderly woman.

At the age of 61 years the patient, a white Jewish female, was admitted to the hospital with a history of gastric complaints. A gastric resection was performed, and the pathological report of the specimen was adenocarcinoma of the stomach with ulceration. A postoperative gastrointestinal series a month later revealed evidence of a well-functioning gastroenterostomy and a small para-esophageal herniation of the cardiac end of the stomach. There were no clinical symptoms of the gastrointestinal tract since that time.

On her present hospital admission, at the age of 65 years, the patient complained of pain in the lower back region of 2 weeks' duration, vaginal bleeding of one week's duration and pruritis of the external genitals for the past 15 years. She had had 2 miscarriages and 4 normal children; the menopause occurred at the age of 38 years. A soft palpable mass was detected 2 fingers above the symphysis; there was no palpable inguinal lymphadenopathy. There was a sanguineous discharge from the external os of the cervix. The cervix was freely movable with no parametrial fixations. The uterus was freely movable, the size of a 6 weeks' gestation. An impression diagnosis of adenocarcinoma of the uterus was made, and a curettage with radium insertion was performed.

The pathologic report of the uterine curettings revealed that there was a marked amount of blood and necrotic tissue with occasional islands of atypical darkly stained cells with hyperchromatic nuclei having no definite formation. Neoplastic cells were very scanty in the specimen. The diagnosis was anaplastic carcinoma of the uterus (grade III).

A panhysterectomy was performed. Tubes and ovaries showed nothing of note. The diagnosis was anaplastic carcinoma of the uterus. Nine months after operation the patient showed no loss of weight, no lymphadenopathy and no parametrial involvement on vaginal examination. 3 figures.

(The fact that a patient has been cured of one type of carcinoma does not mean that she cannot later develop a totally different type in another organ. In some cases it is difficult to exclude the possibility of a late metastatic recurrence, but in others, as in the one reported by the authors, such an explanation would be untenable. While such instances are relatively rare, it is perhaps less rare to encounter multiple malignancies actually co-

existing, and many cases of this sort have been observed. Here again one may find difficulty in deciding as to the separateness of the cancers, especially in view of the variations in pattern of tumors, sometimes imposed by different tissue environment. Not only different types of carcinoma may co-exist, but carcinoma and sarcoma may be present at the same time in the same organ or in two different organs. We have encountered a number of such multiple malignancies in our laboratory.—Ed.)

## PELVIC LEIOMYOSARCOMA

B. RICKFORD

Proc. Roy. Soc. Med., 39: 583-584, 1946

A 47 year old patient's only symptom was an abdominal tumor which extended to the umbilicus and had been noticed for 4 months. Examination disclosed a smooth doughy tumor which was thought to be ovarian. Severe uterine hemorrhage, following admission, necessitated curettage and transfusion. The removed tissue was normal post-menstrual endometrium. Laparotomy was performed one month later because of severe abdominal pain. The peritoneal cavity contained hemorrhagic fluid and a smooth, elastic pinkish tumor. Thick fleshy exuberances were seen in several areas through the tumor wall. The growth was firmly impacted in the pelvis and removal was completed with difficulty. Pan-hysterectomy was not performed because of the degree of blood loss, and the uterus did not appear to be the origin of the tumor. A section revealed "fibromyoma with inflammation and necrosis."

Five months later a recurrence caused obstruction of the pelvic colon, and colostomy was performed. A tumor similar to the first was arising from the pelvis and there were large fleshy secondaries growing over the peritoneum. One of these,  $2\frac{1}{2}$  inches high and growing at the bladder fundus, was contracting and relaxing like the movements of a jelly-fish. A biopsy revealed spindle cell sarcoma. The patient died 2 months later, and at post-mortem examination an attempt was made to discover the cause of twitching of the secondaries. In a section of pleural metastatic growth unstriated muscle was demonstrated.

The author concludes that the presence of motility in an apparently spindle-celled sarcoma and the presence of unstriated muscle cells in an area of spindle-celled sarcoma in a distant metastasis supports the contention of Handley and Howkins that uterine sarcoma originating in a fibroid always grows from the muscle cells.

(There will be little difference of opinion as to the correctness of the author's conclusion that uterine sarcoma arising in a myoma is of myogenic origin, and this has long been the prevailing concept. Meyer and others believe, however, that the origin is not from the mature muscle fibers of the uterus, but from immature muscle cells.

The author's case was obviously one of sarcomatous myoma at the first operation, in spite of the negativity of the pathological report. It is easy to overlook sarcoma in a myoma, because the sarcomatous areas may, in the earlier stage, be definitely localized

and sometimes quite small. This brings up the question of the "recurrent fibroids" of which the older authors so frequently wrote. One of the most striking of these cases was that of Christophorakos (*Zentralbl. f. Gynäk.*, 57: 1935, 1933) who had 3 recurrences of "fibroids" following hysterectomy, with always a report of benign myoma, though many blocks are said to have been made. A fourth operation for still another recurrence revealed a myoma in which areas of polymorphic sarcoma were found, and the patient died 2 years later. It may safely be assumed that any myoma which recurs after hysterectomy is the seat of sarcomatous change.

As for the author's description of the "quivering" in the secondary growths on the peritoneum, explained by him on the basis of the muscular constituents of the growths, I am frank to say that this is a new one on me. It would probably seem rather weird to come face to face with one of these twitching growths, and I might even be frightened. The ordinary myoma contains far more muscle than did the sarcomatous growth in the author's case, and yet I have never seen one of them put on a terpsichorean performance for my benefit.—Ed.)

## COMPLETE TORSION OF A FIBROID UTERUS WITH ITS ADNEXA

A. H. HUNT AND L. W. PRICE

*Brit. J. Surg.*, 34: 90-91, 1946

The case is reported of a 51 year old woman who was admitted to the hospital with complaints of severe, central abdominal pain, vomiting and constipation. Menstrual periods had been becoming scanty. There had been weight loss in spite of a protruberant abdomen which was found to be distended with a tender mass extending to within 3 inches of the xiphisternum. At operation an exceptionally large fibroid uterus was found which had twisted 3 half-turns (540 degrees) in a clockwise direction, carrying with it both tubes and ovaries. The entire mass was intensely congested; tubes and ovaries were blown up and black. After untwisting the mass, subtotal hysterectomy and bilateral salpingo-oophorectomy were performed. Recovery ensued.

The specimen weighed 9 lb., 10 oz., and measured 11 in. in its vertical and maximum transverse diameters and 8 in. antero-posteriorly. The uterus contained confluent fibroids which, on histological examination, proved to be typical fibroleiomyomata. There was intense congestion and engorgement of the intramural uterine vessels and extensive interstitial hemorrhage. The ovaries showed interstitial hemorrhage, but no evidence of tumor. 3 figures.

(It is well to remember that torsion of the fibroid uterus, like the pregnant uterus, can take place, though the occurrence is even more rare than the latter. Not quite so rare is torsion of the pedicle of subserous pedunculated myomas. One of the few cases I have seen involved a tumor weighing a good many pounds, and with a pedicle at least 2 inches thick. And yet this pedicle had undergone torsion, with the production of symptoms quite similar to those seen with torsion of ovarian cysts. As a matter of fact, this was the preoperative diagnosis in the case mentioned. While the pedicle of an ovarian cyst

may be completely twisted into a rope-like cord, the somewhat more substantial pedicle of most pedunculated myomas is apt to be more resistant, and the torsion is more likely to be less extreme.—Ed.)

## A HOME-MADE REPOSITOR FOR CHRONIC INVERSION OF THE UTERUS

H. A. HEZLETT

*J. Obst. & Gynaec. Brit. Emp.*, 53: 185-186, 1946

The treatment of an inverted uterus in a 25 year old woman, admitted to the hospital at Dohad, India 5 days after delivery of her first baby, is described. The patient had been in labor for 3 days and delivery was accomplished only after village midwives had exerted much pressure on the abdomen. Abdominal pressure had again been applied to hasten expulsion of the placenta, and apparently the uterus had been expressed with the latter.

Until August 28, 4 days after admission, the temperature varied between 100 and 102 degrees F., and the pulse between 120 and 140. Quinine sulfate was given from admission until August 31, when sulfanilamide was commenced. On September 8 the sulfanilamide was stopped because the temperature had not been above 99.4 degrees F. since September 3, the pulse had steadied at 120 and the lochia had practically ceased.

The author was unable to procure an Aveling's repositor. Therefore, he attempted to devise his own, avoiding the alleged disadvantage of the Aveling model; i.e., after uterine replacement is accomplished there is sometimes difficulty in getting the head of the repositor out of the uterus if the cervix contracts behind it. The model evolved by the writer was an S-shaped contrivance made of galvanized iron wire with a torpedo-shaped end to be applied to the uterus, thus keeping the cervix sufficiently dilated to allow withdrawal of the repositor.

On September 16 the home-made repositor was sterilized and, following a Dettol douche, it was placed in position against the inverted fundus, and the vagina was packed with sterile gauze. Four bandages from the free end of the S were tied to a waist bandage, which was steadied by a shoulder bandage, thus holding the repositor in position. The apparatus was removed after 24 hours, and because the torpedo end had cut the muscle of the uterine wall, the torpedo frame was padded and covered with a rubber condom to keep the padding from becoming soiled and septic. Following a douche the repositor was reinserted and packed into position.

On September 17 the fundus was level with the external os, and on the following day it was well inside the internal os. On September 19 the inversion was found to be completely replaced, and the repositor was discarded. On September 26 the uterus was found well involuted with the cervix closed, and on September



28 the patient was discharged, the pulse and temperature having been normal for the past 7 days. 1 figure.

(Inversion of the uterus is extremely rare, and it is probable that most gynecologists have never seen an instance of the chronic type, which may persist for months or years after delivery. As for the Aveling repositior, I have seen no recent mention of its employment, although there were occasional reports of its use in the older English literature. It is difficult to believe that it could be effective once the cervix has contracted around the inverted uterus, and certainly some such surgical procedure as the Haultain operation would be the treatment of choice in most cases.—Ed.)

## THE CAUSE OF PROLAPSUS UTERI IN WOMEN IN THE LIGHT OF PERINEAL PROLAPSE IN MICE

H. BURROWS AND P. J. EWERS

J. Obst. & Gynaec. Brit. Emp., 53: 377-378, 1946

The authors have studied 547 female mice, all of which lived for 6 months or longer and all of which cohabited with a male. Prolapse of the vaginal perineum was found in 48, or 8.6 per cent of these mice. The condition was not peculiar to advanced age. Significant is the fact that among the 48 mice with prolapse, 68.7 per cent were sterile, while among the 499 mice without prolapse, 46.6 per cent were sterile. Furthermore, the mice which eventually developed prolapse, even though they were sometimes fertile in early life, bore fewer litters than the others.

When the condition is examined in the living mouse the earliest sign is a slight patency of the vagina. Postmortem examinations reveal sinking of the bladder and lower ends of the uterine cornua below the pelvic brim. It is remarkable that in every instance, whether in the incipient or advanced stage of the lesion, investigation has revealed an enlargement of the vagina.

These observations on mice raise an interesting point in connection with human pathology. It seems possible that in women, as in mice, chronic dilatation of the vagina with perineal prolapse may be the result, not of any initial laceration or stretching of the pelvic ligaments during labor as is commonly thought, but of a failure of the vagina to involute completely afterward. If this is the case, methods of treating the condition may become modified, and prophylaxis may be possible. 3 figures.

(One must question the applicability of these studies on mice, and the authors' conclusions therefrom, to the problem of prolapse in women. The most important factor in the latter is, with good reason, felt to be weakness of the cardinal and uterosacral ligaments, most often following childbirth, though in some forms of prolapse other factors are of importance. For example, a congenital weakness of the pubovesical fascia will certainly predispose to a herniation of the bladder through the fascia, as manifested in the cystoceles sometimes seen, as may also prolapse, in nulliparous women. In such cases there is certainly no such widening of the vagina as the authors consider so important in the production of prolapse. Again, even extreme vaginal relaxation, with perhaps cystocele and rectocele, is not infrequently seen in women whose uteri are in excellent position, with no suggestion of prolapse.—Ed.)

## THE ADNEXA

### A REVIEW OF ONE HUNDRED CASES OF OVARIAN CANCER

E. V. HELSEL

Am. J. Obst. & Gynec., 52: 435-439, 1946

The author has reviewed 100 cases of ovarian cancer; 35 of these could not be traced, and the remaining 65 have been traced from treatment to death or to a survival as long as 10½ years. Fifty-two tumors were bilateral, while 32 were unilateral. Pathological diagnosis revealed 62 papillary cystadenocarcinomas, 7 pseudomucinous cystadenocarcinomas, 6 granulosa cell tumors, 5 solid carcinomas and a variety of other types. The most commonly associated pathology was ovarian cyst, fibroid and pelvic infection.

Four patients were Negroes. Sixty-three per cent of the series were between the ages of 40 and 60 years, and more than half were past the menopause. Most patients had had normal onset of menstruation; 29 per cent had some menstrual disturbance, chiefly metrorrhagia. There was a high incidence of sterility in this series; 24 patients were single and 76 were married, and 41 per cent of the series were nulliparous. Sixty-eight per cent of all patients were considered incurable when they first presented themselves, yet over 18 per cent had symptoms less than one month before they were first seen. Thirty-one per cent were examined within 2 months of the onset of symptoms. Seventy-five per cent of the series had abdominal pain, 44 per cent had abdominal enlargement, 32 per cent had loss of weight, 29 per cent had abnormal vaginal bleeding, 18 per cent had marked constipation, 17 per cent had a palpable tumor and 17 per cent had vomiting. Cases presenting frozen pelves and abdominal fluid were correctly diagnosed most frequently.

Surgery was attempted in all but 5 cases which were considered utterly hopeless. In 76 cases more or less of the primary and metastatic growth was removed. In  $\frac{3}{4}$  of the cases only part of the tumor could be removed; in  $\frac{1}{4}$ , all of the tumor seen at operation could be removed. There was immediate mortality of  $\frac{1}{6}$  of all cases treated; 3 deaths had causes unrelated to malignancy. The survival time was 3 times as great when all the tumor could be removed.

Of the 65 cases traced, 19 had operation plus radiation, 39 received operation alone, and 2 had radiation alone. The average survival time after operation plus radiation was 35.3 months; after operation alone, 11.7 months; after radiation alone, 1.5 months; without treatment of any kind, 2.5 months.

Histologic grading proved of little importance in prognosis. Clinical grouping seemed of more importance. In clinical Group I the tumor was completely removable, and of the cases traced in this group the average survival time was 38 months. In clinical Group II the tumor was completely removable but with involvement of other tissues which could be removed; the average survival

time was 36 months. In clinical Group III the tumor was only partly removable due to extension to near-by structures which could not be removed; the average survival time was  $19\frac{1}{2}$  months. In clinical Group IV the tumor was irremovable because of extensive involvement of adjacent parts or distant metastases; the average survival time was  $5\frac{1}{2}$  months.

The author concludes that the degree of removability of the growth plus use of radiation largely determines the survival time. While the curative value of radiation is low, postoperative radiation often increases the comfort, and improves the psychologic state of the patient. The impression is that removal of the primary growth enables the patient to carry on a useful life in comfort, sometimes for years, making the operation worthwhile.

(While this is a worthwhile statistical study, its value would probably have been enhanced by a sharper break-down into groups on the basis of histological classification, at least in so far as evaluation of end results is concerned. The author states that histological grading proved of little importance in prognosis, and this is perhaps essentially true. But such histological types as granulosa cell carcinoma, dysgerminoma and arrhenoblastoma (no cases of the two latter types are included in the author's series) are certainly far less malignant than the ordinary type of ovarian carcinoma, and they should be statistically segregated. The clinical grading employed by the author is a very rational one, and the marked variation in survival rate observed in these various grades is what one might expect. Like others, the author feels that removal of the primary growth is advisable when it can be safely accomplished, even in the presence of obvious secondary extensions and metastases, as it does seem to have a retarding influence on the progress of the disease. As for postoperative radiation, most gynecologists employ it, although probably with no great degree of enthusiasm. While there is some evidence, as in the author's own series, that life can be prolonged, it is difficult to evaluate this point very precisely, in view of the marked individual vagaries of both tumors and patients. I rather think that in many hopeless cases we employ postoperative radiation just because it is about the only thing left to do that is at all rational.—Ed.)

## PAPILLARY CYSTADENOCARCINOMA OF THE OVARY

J. K. CROMER

M. Ann. District of Columbia, 15: 425-428, 1946

In discussing carcinoma of the ovary, the author refers only to such cases as fall into the category of papillary cystadenocarcinoma, both serous and pseudomucinous. This is the commonest kind of malignant growth and nearly always arises from malignant degeneration of a cystadenoma. A papillary cystadenocarcinoma is characterized by intracystic and extracystic, delicate, frond-like excrescences. It is bilateral in 35 per cent of cases, and is associated with peritoneal implants and with ascites. The disease can occur at any age; in Pemberton's series the average age was 49 years. Usually the patient presents herself after a short period of local symptoms, when the growth is so advanced as to be inoperable. Salvage rates or 5-year cures have been reported as anywhere from 10 to 50 per cent.



Small papilliferous growths had invaded the pelvic peritoneum. Total hysterectomy and bilateral salpingo-oophorectomy were performed, removing as much of the pelvic peritoneum as possible. Recovery was uneventful. Deep x-ray therapy was given about 6 weeks later. Four months after operation abdominal ascites had recurred, and a hard mass could be felt rising out of the pelvis.

Pathologically, the uterus showed metropathia hemorrhagica. The left ovarian tumor, measuring  $2\frac{1}{2}$  by  $1\frac{1}{2}$  inches, consisted mainly of 2 cysts. One cyst, with a fine papilliferous lining, contained blood-stained fluid. The other cyst was not opened. Section of the growth showed it to be a papilliferous adenocarcinoma. The right ovary was replaced by a solid yellowish-white tumor, measuring  $2\frac{1}{2}$  by 2 inches. There was a small cyst at its base and the surface was studded with small nodules. Section showed it to have a stroma analogous to that of a fibroma. It harbored numerous cavities, some elongated and some cystic, which were lined by a malignant epithelium. Another section showed the presence of fat in degenerated cells floating in the lumen of cystic cavities, and also in the stroma cells. The tumor was a xanthofibroma theco-cellulare.

Schiller believes that these tumors arise from ovarian mesenchyme and regards them as a subgroup of fibromata. However, Novak states that they are granulosa-celled tumors which have become luteinized. In support of the latter view, Traut and Butterworth have produced thecomata and granulosa-cell tumors in immature mice by irradiation of the ovaries. 4 figures.

(In this case there was apparently a papillary carcinoma in one ovary, while the other was the seat of what, from the description, was a partially luteinized thecoma. Such luteinization may occur in tumors of either granulosa cell or thecal type. In at least some of these cases, the lutein transformation of the cells is associated with the production of progesterone, so that the endometrium shows definite secretory activity, even in women well beyond the menopause. In other cases the lutein change appears to be morphological rather than functional, so that only estrogen effects are noted. When complete luteinization occurs, one type of so-called luteoma is produced. As to other varieties of what some call luteoma, some are undoubtedly of adrenal type, and in some there is much confusion of thought as to the source of the constituent cells. To this group the convenient but rather unsatisfying designation of masculinovoblastoma is often applied.—Ed.)

## SOLID TERATOMA OF THE OVARY

JEAN F. CAMPBELL

Canad. M.A.J., 55: 377-379, 1946

Solid teratomas of the ovary occur most frequently before or during adolescence and usually run a rapidly malignant course. The mortality rate in the world literature is 65 per cent. The author discusses the 2 main theories of origin of these tumors. Ewing considers that, since the unfertilized ovum is able to produce all types of tissue, some unknown stimuli may start development

Three cases are presented which illustrate some of the difficulties involved in diagnosis and treatment. The first case shows the value of combined preoperative radiation and surgery in cases of ovarian malignancy with omental cake and intestinal implants. Although the patient still has cancer, as evidenced by findings in sections of omentum removed at a recent operation for intestinal obstruction, she is living and well 7 years after beginning treatment. In the second case there was continued bleeding after a diagnostic curettage which was negative for uterine pathology. Ovarian malignancy must be suspected in any patient over 50 years of age with irregular bleeding, even with negative uterine pathology. The third case illustrates the unreliability of grading ovarian tumors in respect to prognosis. The tumor in this case was reported as a very slow-growing grade 1 neoplasm, with an excellent prognosis, yet the patient developed pulmonary metastases within 2 months after operation while receiving x-ray treatment, and died within one year.

The proper treatment of malignant ovarian epithelial growths is radical surgery, with removal of both tubes, both ovaries, uterus and cervix. In cases with extensive pelvic involvement, careful roentgen therapy will frequently make them operable.

(The papillary cystadenocarcinomas of the ovary are not only extremely common, but as a group highly malignant, and I do not think a 5-year salvage rate of anything like 50 per cent can be expected. This group presents interesting problems of both microscopic diagnosis and prognosis. It is easy enough to distinguish a very frankly benign serous papillary cystadenoma from a frankly malignant papillary cystadenocarcinoma, but there is an intermediate group in which there are sure to be differences of opinion among even expert pathologists. My experience has been that where the tumor is thus doubtful microscopically, it is safer to assume its clinical malignancy. Even the histologically benign serous cystadenoma may implant itself on the peritoneum, with often the later development of ascites and ultimate death, though sometimes not for a good many years. It is because of such vagaries that the Ovarian Tumor Registry is anxious to get as many such cases as possible, with the hope of later follow-up, and perhaps the establishment of a more satisfactory clinico-histological correlation than is now possible.—Ed.)

### XANTHOFIBROMA THECOCELLULARE, WHICH BECAME THE SITE OF A SECONDARY CARCINOMA FROM THE OPPOSITE OVARY

E. W. C. BUCKELL

Proc. Roy. Soc. Med., 39: 576-577, 1946

The patient, aged 66 years, complained of vaginal bleeding for 6 days, 3 weeks before admission. The menopause had occurred 24 years previously. Examination revealed abdominal ascites and a hard fixed mass in the pouch of Douglas. Operation revealed bilateral ovarian tumors with papilliferous surface growths.

fact that the author's case was multicystic suggests that only portions of the tumor might have been teratoma. Also of interest is the pseudomucinous character of the cyst, since the origin of this type of cyst is believed to be teratomatous, and since small or even microscopic pseudomucinous cysts are a common finding in teratoma.—Ed.)

## TORSION OF ADNEXAL TUMORS AND ITS RELATION TO SURGICAL EMERGENCY

M. R. KELBERG AND J. H. RANDALL

Am. J. Obst. & Gynec., 52: 464-468, 1946

The present study was undertaken to test the validity of the commonly held view that a twisted pedicle, as a complication of noninflammatory adnexal tumors, which is producing definite symptoms requires immediate operation. Forty-two cases of adnexal tumors with symptom-producing torsion of the pedicle, confirmed at laparotomy, are reviewed. The torsion in every instance was at least 180 degrees.

The most common symptoms were pain, tumor, nausea and vomiting, and their severity seemed proportional to the suddenness of attack. The onset was sudden or gradual, and the symptoms constant and severe, or mild and intermittent. The interval between appearance of first symptom and hospital examination averaged about one year, varying from 8 hours to 16 years.

Acute lower abdominal tenderness was the most significant physical finding, being present in 35 cases, and usually associated with muscular rigidity. A mass was noted on abdominal palpation in 35 cases, while in 6 others it was detected only on bimanual examination, and in one case no adnexal enlargement was noted. The febrile reaction and leucocyte response were not remarkable.

The period of preoperative observation averaged more than 2 days, and except in rare instances, the condition was not considered an acute emergency. Pseudomucinous and serous cystadenomas, dermoids and fibromas were most frequently encountered, but apparently any cystic or solid pedunculated mass may be involved. The incidence of tumors larger than a grapefruit (35.4 per cent) may be significant, since acute and chronic torsion with its circulatory disturbance should lead to enlargement on a mechanical basis. Operation was well tolerated, and recovery was usually rapid and uncomplicated. The single fatality in this series was due to cerebral hemorrhage in a 63 year old woman.

The authors conclude that a clinical diagnosis of twisted pedicle demands operative intervention, but not as an absolute emergency. When the diagnosis is doubtful, a period of observation does not significantly increase the patient's risk.

(While torsion of adnexal tumors is commonly considered among the acute abdominal emergencies, I agree with the authors that the emergency is usually not as urgent as many others, and that it is often overlooked for long periods of time, as the authors' study in-

of the unfertilized sex cell, which produces a fetus-like tumor. Marchand-Bonnet's theory is that, during the development of the fertilized ovum, one blastomere becomes segregated, later developing into a teratoma. This isolation of the blastomere is similar to the process which occurs in the formation of identical twins, and might be considered a failure in the process of twinning. Teratomas are more frequent in families where twinning is frequent.

The case is reported of a 13 year old girl, 5 feet, 4 inches tall, weighing 160 pounds, in whom the menarche had just occurred. Secondary sex characteristics were not developed. Pelvic examination was negative. The basal metabolic rate was  $-3$ , and because of the obvious endocrine imbalance, the patient was put on thyroid and a low carbohydrate diet.

One year later the patient was again seen, complaining of abdominal enlargement of 2 months' duration with amenorrhea. The abdomen was found to be enlarged to the size of a 7 months' pregnancy, symmetrical and of a rubbery hardness. No fetal parts or heart beats could be detected. Pelvic examination revealed a firm mass pulling the uterus up out of the pelvis. A diagnosis of pseudomucinous cystadenoma of the ovary was made.

At operation an immense tumor was found, extending from the xiphoid cartilage to the pelvic brim. Adhesions to surrounding structures were divided with difficulty and the tumor was clamped off at its pedicle (in the right mesovarium) and excised. The uterus and left adnexa were normal and were left. Recovery was uneventful, and subsequent examinations at 6-weekly intervals for a year have revealed no sign of recurrence or metastases. Normal menstrual periods have been resumed.

The specimen was a very large, firm, nodular, greyish-colored mass weighing 5850 gm. The capsule was intact. A few thin-walled cyst-like structures protruded from the surface. Cut surface showed a diffuse multicystic structure, the cysts being filled with pseudomucinous secretion. Microscopic examination revealed extreme pleomorphism. Small cysts occurred throughout, as did islands of embryonal cartilage. In some areas there were foci of lime salt infiltration. The solid portion of the tumor was largely myxomatoid and contained plain muscle fibers, adipose tissue, small groups of blood sinusoids and other poorly differentiated structures.

The fact that there has been no recurrence during the first postoperative year of a tumor which grew so actively in the previous year points to a benign, rather than a malignant, teratoma in this case. The author mentions the possibility of retarding metastasis with androgens, which will be used in the present case if the need arises. 1 figure.

(The rather amazing rapidity of growth of this tumor is of interest, since it apparently reached the size of a 7 months' pregnancy within a comparatively few months. The other feature of interest is that the tumor was apparently not the characteristic solid type of teratoma which histologically is usually a pot-pourri of tissues derived from all three of the embryologic layers, and not always easily identifiable. Such tumors are likely to be quite solid, though small cyst-like cavities can be noted. They often produce comparatively early metastases, sometimes before the original tumor becomes very large. The



Operation was performed on the fifth hospital day. A dark mass was found from which the adherent small bowel was freed. The mass, an ovarian cyst with one complete rotation of the pedicle, was then removed. The anatomical diagnosis was dermoid cyst of the ovary, with torsion and infarction.

(This case illustrates again the fact that there is often a considerable lag between torsion of the pedicle of an ovarian cyst and operation, largely because of the frequent difficulty in diagnosis. It is easy to appreciate the difficulty in the above-abstracted case, of differentiating between a number of possible conditions. In the preceding abstract attention was called to the frequent lag between the torsion and the operation. While such torsion is commonly looked upon as an acute abdominal emergency, immediate operation is not as urgently indicated as it is with other acute lesions, such as acute appendicitis or perforated ulcer. The fact remains, however, that it is wise not to delay operation if such a diagnosis is made, since local inflammatory reaction, with adhesions and even occasionally secondary infection and suppuration may develop and increase the hazard of operation. (See abstract of paper by Kelberg and Randall, *Am. J. Obst. & Gynec.*, 52:464, 1946, on page 94, with editorial comment.—Ed.)

## OVARIAN CYST WITH TWISTED OMENTAL PEDICLE

F. H. FINLAISON

*Proc. Roy. Soc. Med.*, 39: 579-580, 1946

A 39 year old woman complained of intermittent attacks of sharp abdominal pain for 10 years. A mobile, cystic, slightly tender tumor was felt in the abdomen. The diagnosis was ovarian tumor with intermittent torsion, and laparotomy was performed. The tumor was found to be attached only to the great omentum, from which it obtained its entire blood supply, and which was twisted through 2 complete circles. The cyst had come from the right side. The tumor was removed by cutting the omentum, and attached to it was the fimbrial end of the fallopian tube with a hydatid of Morgagni. The cyst appeared to be a dermoid.

On further questioning, the patient recalled a severe 2-day attack of abdominal pain at the beginning of her trouble 10 years previously. It is suggested that at this time complete torsion of the pedicle had been followed by sloughing of the cyst, but it had acquired a secondary omental attachment and blood supply. The omental pedicle had then undergone intermittent torsion during the ensuing 10 years.

(The ovarian cyst in this case was evidently of so-called parasitic type, an even more rare variety than the parasitic variety of myoma. In the latter, a pedunculated subserous myoma receives more and more of its blood supply from the adherent omentum and less and less from the uterus, until finally it is completely weaned away from the latter, and is apt to float about the abdomen on its loose omental attachment. Such an occurrence would be far less likely with ovarian cysts, because of the richness of the blood supply

dicates. For that matter, there is little doubt that many of the less complete torsions correct themselves. The history of perhaps rather frequent attacks of sharp abdominal pain in women with small or moderate-sized ovarian cysts is undoubtedly often to be explained by partial or incomplete twists of the pedicle.

On the other hand, in the more complete and persistent torsions the circulation of the adnexal mass is completely cut off, with continuance of the abdominal pain, fever, tenderness, vomiting and often much surrounding inflammation and possibly secondary infection, so that an operation which is long delayed becomes more difficult and more hazardous. The fact that such good results were obtained in the large series of delayed operations reported in this paper is not an argument against prompt operation once the diagnosis is made, and with this view the authors will undoubtedly agree.

Torsion may be so complete that the adnexal mass is twisted off entirely, and cases have been reported in which such detached tumors, even of considerable size, have been completely absorbed. I have encountered 3 instances in which operation done for other indications has revealed, in adult women with no history of previous operation, a complete absence of the tube and ovary of one side, a defect which it would be very difficult indeed to explain on embryological lines. In all three of these patients, however, careful examination showed a short stump of tube, like that seen when the tube is amputated close to the uterus. The explanation of such a picture is that sometime in the previous life of the patient, perhaps even in fetal life, a complete torsion of the adnexa had occurred, with auto-amputation of the adnexal mass, and later resorption.—Ed.)

## DERMOID CYST OF OVARY, WITH TORSION AND INFARCTION

F. INGERSOLL, L. S. MCKITTRICK AND B. CASTLEMAN

New England J. Med., 235: 340-341, 1946

A 43 year old woman entered the hospital complaining of pain in the right lower quadrant of the abdomen. She had had ulcerative colitis for about 12 years. A month before admission, coincident with the onset of the menstrual period, there was an ache in the right lower quadrant with nausea and vomiting. The symptoms disappeared when the period ceased. Several days before admission, with the occurrence of the next period, she developed an ache in the right lower quadrant which became severe, radiating around the right flank and up toward the right costal margin. She vomited and was unable to retain anything by mouth for 3 days. On admission the pain was less severe and there was no vomiting. No stools or flatus had been passed for 4 days.

The abdomen was distended, with moderate spasm and acute tenderness in the right lower quadrant. Rebound tenderness was referred to the right and there was a questionable mass in the right lower quadrant. Pelvic examination revealed acute tenderness in the right vault. The temperature was 101.5 degrees F. and the white cell count 23,400 with 90 per cent neutrophils. Dysuria developed on the second day, with gross blood in the urine. The mass in the right lower quadrant became more definite and slightly larger. The clinical diagnosis was ovarian cyst with twisted pedicle, and Dr. Ingersoll's diagnosis was ruptured appendix with pelvic abscess.

complete removal of all ovarian tissue brings about regression of the intestinal lesion and clinical cure. The extensive and usually very difficult resections which were done in such cases in former years have very properly been abandoned.

Unfortunately, some of these patients do not present themselves until obstruction has actually occurred, so that many cases have been reported in which colostomy has been necessary as a life-saving measure. Clayton wisely calls attention to the fact also, that intestinal endometriosis, perhaps of obstructive type, can occur even when there is no demonstrable endometriosis of the pelvic organs themselves, although this is a far less frequent occurrence than the association with pelvic endometriosis. Some time ago, in the course of a hysterectomy for myoma, I noted a hard, almost stony annular mass high up in the sigmoid. It was thought to be an annular carcinoma, especially as there was not the slightest suggestion of endometriosis in the ovaries or elsewhere in the pelvis. After the hysterectomy, x-ray barium enema studies confirmed the presence of what was apparently a partially obstructive lesion, and a resection was done. Typical endometrial tissue was revealed on microscopic study, with no suggestion of malignancy. Since then I have studied sections from a similar case encountered by one of my colleagues, the lesion in this case being located in the terminal portion of the ileum.

## ENDOMETRIOSIS IN YOUTH

J. FALLON

J. A. M. A., 131: 1405-1406, 1946

To disprove the common belief that youth does not have endometriosis, 4 per cent, or 9 cases in 225 patients seen at the Fallon Clinic with external endometriosis were less than 20 years old, the youngest being 13 years. Seven series of cases totaling 2400 patients from the literature are cited in which only 6 were under 20 years of age.

The author has looked for endometriosis in the teens for 2 reasons. First, the disease is a sterilizing one; hence, it would be more useful to treat it in youngsters. Second, the disease should occur as early as the teens. This is based on the observation that endometriosis tends to occur after about 5 years of incomplete sexual function (menstruation without pregnancy).

Since endometriosis has been suspected, looked for, and found in the teen age group, it is probably true that the incidence of the disease before the age of 20 years was greater than the 4 per cent proved microscopically in this series.

The following conclusions were drawn from this series of cases: (1) Endometriosis should enter into the differential diagnosis of abdominal pain as soon as menstruation has been established. The cardinal symptom seems to be increasing dysmenorrhea. (2) In females, appendectomy should be done through a midline incision to allow light enough for inspection, not merely palpation of the deep pelvis.

through the commonly greatly enlarged vessels of the pedicle. However, when the pedicle undergoes torsion, this blood supply is shut off and, for that matter, a tumor can even be completely twisted off. Even large tumors may be completely absorbed, but if the omentum has previously become adherent, it is easy to see that the tumor may establish an adequate blood-supply from it and become a parasitic growth. The fact that in Finlaison's case the original torsion probably occurred 10 years previously illustrates the fact, emphasized in the recent paper by Kelberg and Randall and commented upon in this issue of the Survey, that a long lag often occurs between the torsion and the time of operation. An especially interesting feature of the present case is that the ovarian cyst which had probably become parasitic on the omentum 10 years previously underwent the second torsion of its omental pedicle, which was revealed at operation. See preceding abstract.—Ed.)

## ENDOMETRIOSIS OF THE COLON

H. R. ARTHUR

Proc. Roy. Soc. Med., 39: 575-576, 1946

The patient, aged 31, complained of generalized abdominal pain, increasing in severity, for the past 2 years. Menstrual history was normal, but at the time of each period the abdominal pain was worse and her movements were loose, accompanied sometimes by slight rectal bleeding. On examination the abdomen was found to be tender in both lower quadrants, with no palpable mass. The uterus was normal, but with restricted mobility, due to pain. A tender, hard fixed mass was palpated in the left side of the pouch of Douglas, seemingly adherent to the rectum. The diagnosis was pelvic endometriosis with a second differential diagnosis of carcinoma of the ovary.

Operation revealed several small scattered endometrial nodules on the floor of the pouch of Douglas, and the mass was seen to consist of contracted mesocolon, containing endometrial deposits with a stricture of the bowel at the pelvi-rectal junction. There was complete absence of secondary deposits in the liver and abdominal cavity. The affected area of colon was mobilized and a Paul-Mikulicz resection was performed in 2 stages. Recovery was uneventful. Histological examination revealed typical endometrial tissue in the muscular wall of the colon.

The author comments that endometriosis of the colon may be either part of a coexisting pelvic endometriosis or, more rarely, the primary site of the disease. In the latter type the lesion may be a constrictive one, as in the present case, or a localized endometrioma. In either type the important differential diagnosis is from carcinoma of the bowel.

(Intestinal involvement with endometriosis is not rare, especially when there is extensive pelvic endometriosis. The extension of the endometrial growth to the rectum and sigmoid may bring about enormous infiltration of these portions of the bowel, and a rather perfect gross simulation of malignancy. When such pseudomalignant intestinal lesions are encountered in association with obvious pelvic endometriosis, one can feel reasonably sure of their endometriotic nature. If there have been no serious obstructive symptoms,

complete removal of all ovarian tissue brings about regression of the intestinal lesion and clinical cure. The extensive and usually very difficult resections which were done in such cases in former years have very properly been abandoned.

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## SLIDING HERNIA OF THE FALLOPIAN TUBE

JULES D. GORDON

Am. J. Obst. &amp; Gynec., 52: 336-339, 1946

The author defines a sliding hernia as a hernia in which a part of the sac wall is composed of a retroperitoneal viscus. According to Moschowitz, "the relative frequency of the organs involved in a sliding hernia is roughly inversely proportional to the amount of peritoneal covering"; thus, the organ most commonly involved is the ascending or descending colon, rarely the Fallopian tube.

The case presented in this article is the second case of sliding hernia of the Fallopian tube to be reported. A 41 year old woman complained of a mass in the left inguinal region of 8 years' duration. Two years prior to admission the mass had increased in size, and a dragging sensation was felt when lying on the right side. A mass was noted in the left labium, which gave an impulse on coughing, and the uterus was pulled over to the left side.

Operation, through a left inguinal incision, revealed a bilocular hernial sac closely adherent and posterior to the round ligament. On opening the sac, a tubular mass presented on the posterior wall; this was identified as the Fallopian tube when the fimbriae and a cystic hemorrhagic ovary presented at the neck of the sac. The pelvis was exposed, and it was noted that the fundus of the uterus lay close to the left lateral pelvic wall, and that the left broad ligament was missing. The uterine end of the left Fallopian tube was the only portion of the broad ligament within the pelvic cavity. The rest of the tube entered the internal ring on the posterior wall of the hernial sac. The ovary and fimbriated end of the tube were within the lumen of the internal ring.

The Fallopian tube was transected at its uterine end. The left ovary was removed after cutting and ligating the mesovarium. The tube and its fimbriated end were removed with transection of the sac at the internal ring. The internal ring and peritoneum incised above it were closed, the severed transversus and internal oblique muscles were sutured, and a Bassini repair was performed.

The author reviews the anatomy of the pelvic inguinal region and discusses the formation of a sliding hernia of the Fallopian tube, which is illustrated by his drawings in Figures 1, 2, 3, 4, 5 and 6. Graham has called attention to the unusual amount of fat present about the sac in sliding hernia after the inguinal canal is opened. A moderate-sized lipoma existed in the present case. 6 figures (see next page).

(The mechanism of this extremely rare form of hernia will be better understood by referring to the diagrams which accompany the paper. One may not think of the tube as an extraperitoneal organ, although it actually is, in the same technical sense as is the small intestine. Like the latter, it is an extraperitoneal organ almost completely wrapped in peritoneum. The two layers of the mesosalpinx apparently can be widely separated, allowing a sliding of the tube into the wall of a hernial sac, as in the author's case.—Ed.)

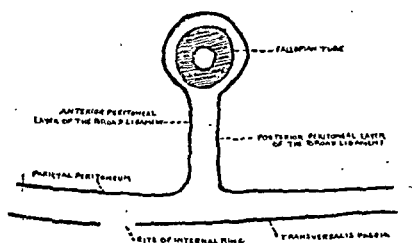


FIG. 1. First stage in development of sliding hernia of the Fallopian tube. Paramedian sagittal section of pelvic inguinal region viewed from the left side showing the proximity of the internal ring to the broad ligament. (Gordon.)

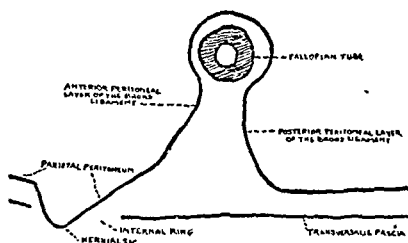


FIG. 2. Second stage in the development of sliding hernia of the Fallopian tube. The leaves of the broad ligament are being separated and the connection of the anterior peritoneal layer of the broad ligament to the posterior wall of the hernial sac is shown. (Gordon.)

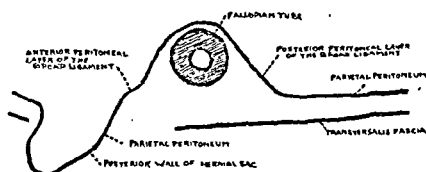


FIG. 3. Third stage in the development of sliding hernia of the Fallopian tube. The inferior portion of the anterior peritoneal layer of the broad ligament is now at the internal ring and makes up the uppermost portion of the posterior sac wall. (Gordon.)

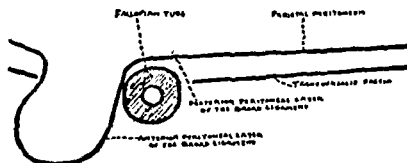


FIG. 4. Fourth stage in the development of sliding hernia of the Fallopian tube. The leaves of the broad ligament have been completely separated. The anterior peritoneal layer of the broad ligament is entirely on the posterior wall of the hernial sac. The enclosed tube is at the uppermost portion of the posterior sac wall at the site of the internal ring. (Gordon.)

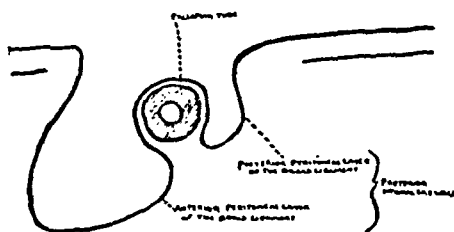


FIG. 5. Final stage in the development of sliding hernia of the Fallopian tube. The anterior and posterior peritoneal layers of the broad ligament with the enclosed tube have become part of the posterior wall of the hernial sac. (Gordon.)

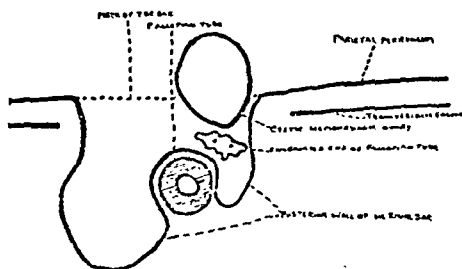


FIG. 6. Sagittal section of sac and contents as found at operation. The Fallopian tube is part of the posterior sac wall. The cystic hemorrhagic ovary is within the lumen of the sac at the site of the internal ring. The fimbriated end of the tube is within the lumen of the body of the sac as one of its contents. (Gordon.)

## PELVIC INFLAMMATORY DISEASE; A SURVEY OF 300 CONSECUTIVE CASES, WITH SPECIAL REFERENCE TO TREATMENT

J. E. TRITSCH, I. H. SAXE AND E. SCHNEIDER

New England J. Med., 235: 414-416, 1946

A group of 297 patients with pelvic inflammatory disease has been studied. Some of these patients were treated by bed rest alone, others by bed rest and sulfonamides and still others by bed rest and surgery.

The incidence of disease was much greater in the younger than in the older age group, decreasing progressively with age. The chief complaints were as follows: pelvic pain, 95 per cent; vaginal discharge, 33 per cent; bleeding, 10 per cent; urinary frequency, 10 per cent; and backache, 10 per cent.

The therapeutic results obtained with bed rest alone and with bed rest with the administration of sulfonamides were practically the same; in the former instance improvement was obtained in 91 per cent of cases, and in the latter,



in 89 per cent. Cure was obtained in 6 per cent of cases both with bed rest alone and with bed rest and sulfonamides.

The incidence of surgical interference in the entire series was low (14 per cent), and was progressively lower in the younger age groups. The percentage of symptomatic and anatomic cures was greater in the patients who were operated on than in those who were not; sixty-three per cent of the patients receiving surgery were improved and 37 per cent were cured.

(In spite of the fact that sulfa therapy for acute pelvic inflammatory disease has been in general use for a good many years and penicillin therapy for a shorter time, and in spite of the fact that practically all reports have indicated their value, it is perhaps still too early to evaluate them precisely and finally. The present report, it will be seen, strikes a rather reactionary note in this respect. Certainly it is true that in many cases of acute gonorrheal salpingitis, for example, there would be a rather rapid subsidence of symptoms with bed rest and other simple measures, before chemotherapy was introduced. And yet the almost universal feeling is that the employment of chemotherapeutic and antibiotic therapy has marked an epoch in this, as in so many other types of infection.—Ed.)

## FEMALE UROLOGY

### REPAIR OF VESICOVAGINAL FISTULA CAUSED BY RADIATION

G. H. TWOMBLY AND V. F. MARSHALL

Surg., Gynec. & Obst., 83: 348-354, 1946

The repair of vesicovaginal fistulas in heavily irradiated tissues is peculiarly difficult for several reasons. First, the blood supply of the local tissues is precarious as a result of vascular radiation damage. Second, such excessively fibrosed tissues are usually quite inelastic and fixed, making coaption of the fistula edges difficult. Third, the fibrosis itself makes dissection very difficult. Fourth, one or both of the ureteral orifices are frequently within the fistula margin; in such cases, to raise flaps or cut off the inner edge of the fistula would necessitate reimplantation of one or both ureters into another portion of the bladder, a difficult procedure in itself, and made more difficult by heavy radiation fibrosis.

The authors present the cases of 3 patients, all of whom had vesicovaginal fistulas as the result of heavy radiation with both radium and x-ray for cervical cancer. In each case the upper vaginal and parametrial tissues were tough and inelastic. The fistula margins were thin and fibrous. The operative procedure employed on each of these patients is briefly described below, and is illustrated in Figures 1 to 7.

The operation is a combined transvesical and vaginal approach. Through a suprapubic incision, a liberal cystotomy is carried out in the higher portions of the bladder wall. The interior of the bladder is exposed by retractors, and the fistula is inspected from above. Ureteral catheters are inserted to avoid damage to the ureters throughout the remainder of the operation. An assistant inserts his finger into the rectum and pushes the posterior vaginal mucosa up against the fistula. A long handled scalpel with a small blade marks out, transvesically, the pattern of posterior vaginal mucosa corresponding to the size, shape and location of the fistula opening. Sterile drapes are placed over the suprapubic wound.

With the patient in the lithotomy position, the interior of the vagina is exposed and the upper third denuded of its mucosa, except for the previously outlined patch on the posterior vaginal wall. The posterior third of the vagina to a point about 2 cm. in front of the fistula is now a raw surface except for this patch. The external edges of this excision are sutured together with interrupted chromic catgut transversely, the anterior vaginal mucosa being sutured to the posterior mucosa at the margin of dissection.

The patient is returned to the dorsal position, and with a long needle holder and long toothed forceps, interrupted chromic catgut sutures are placed at one cm. intervals through the thickness of the fistula margin about 0.5 cm. from the

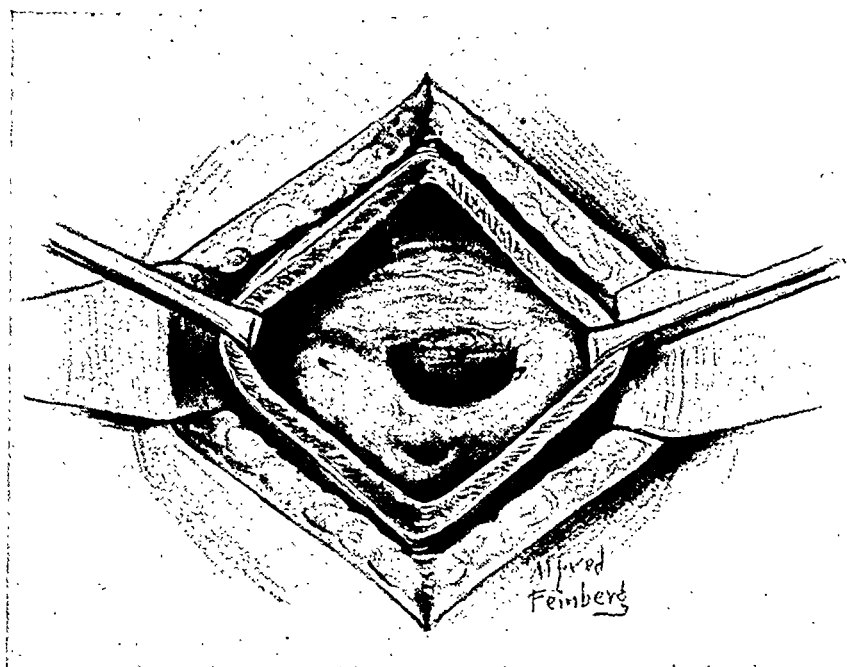


FIG. 1. Appearance through the suprapubic cystotomy. (Twombly and Marshall.)

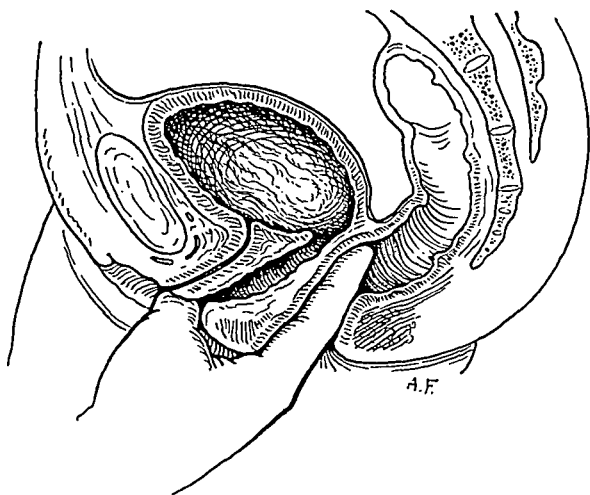


FIG. 2. Sagittal section showing how the posterior vaginal wall is pushed up against the fistula. (Twombly and Marshall.)

actual edge of the opening and through the edge of the posterior vaginal wall patch. During this suturing the ureteral orifices are always in view, and care is taken not to place sutures too close to them. The sutures are tied just tight enough to make the patch and fistula edges touch each other. Thus, the patch

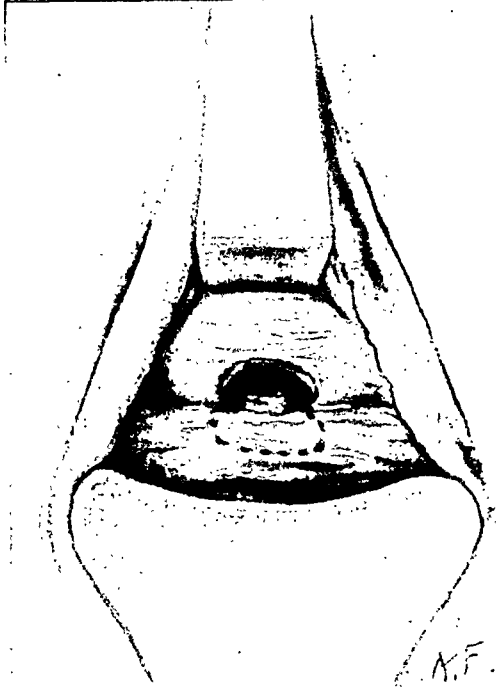


FIG. 3. Vaginal view after patch has been outlined from above. (Twombly and Marshall.)

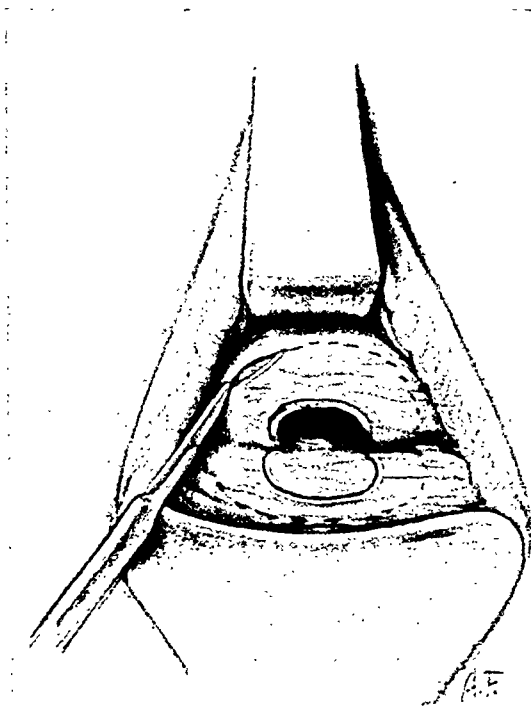


FIG. 4. Beginning removal of the vaginal mucosa. (Twombly and Marshall.)

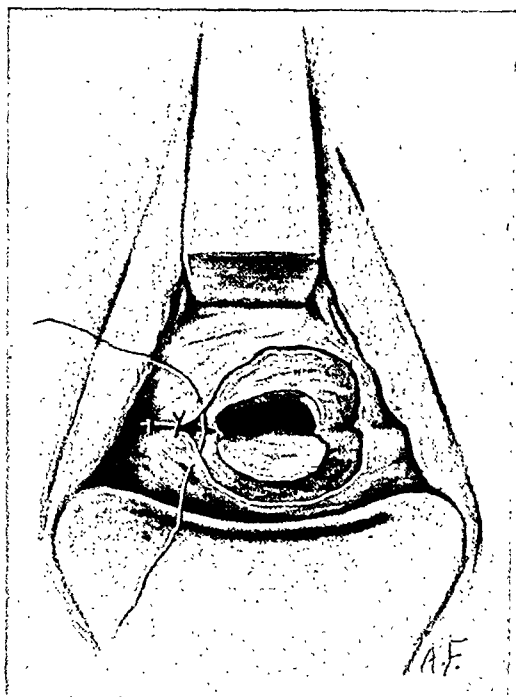


FIG. 5. Transverse closure of external margins of excision. Patch still in place. (Actually the excision of vaginal mucosa is somewhat more extensive than illustrated.) (Twombly and Marshall.)

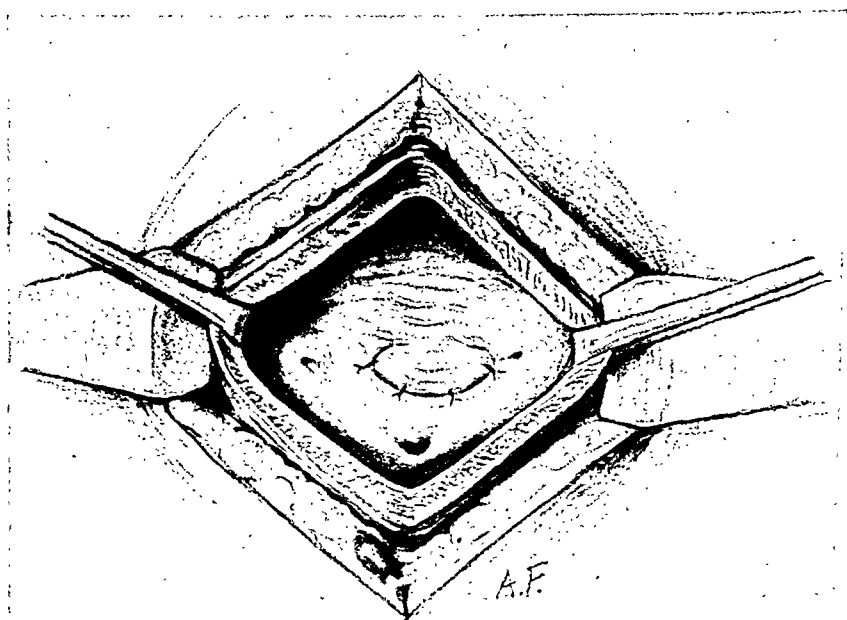


FIG. 6. Cystotomy view showing fistula edges sutured to patch. (Twombly and Marshall.)

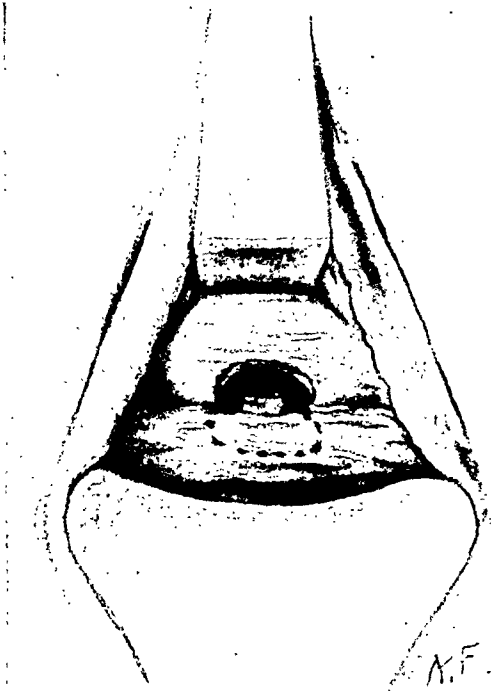


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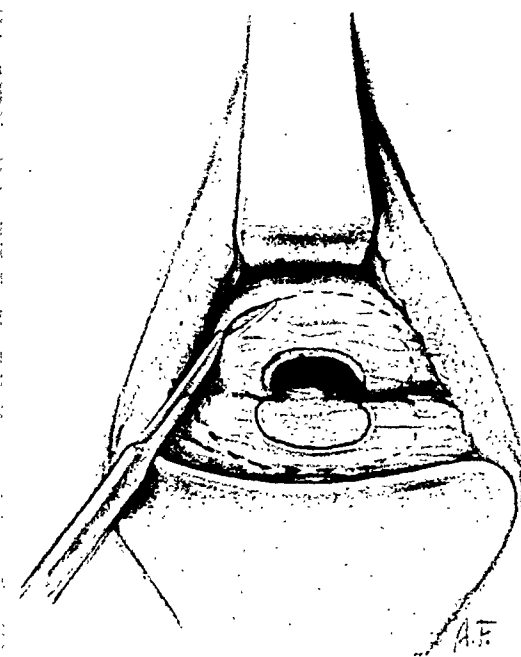


FIG. 4. Beginning removal of the vaginal mucosa. (Twombly and Marshall.)

operation described by the authors must in the very nature of things be a rather difficult procedure, though it apparently did the trick in the 3 cases which they reported. In cases of this general type, on the other hand, a much simpler procedure would seem to be that originated by Latzko, although he himself did not publish its description. The late Frederick C. Holden, however, in what was probably his last publication, described the operation, with excellent illustrations, in 1942, reporting 4 cases in which the operation had been employed with success (*Am. J. Obst. & Gynec.*, 44:880, 1942). I would commend Holden's article to anyone confronted with one of the difficult cases of this general type.—Ed.)

## CYSTS OF THE GENITAL DUCTS, MÜLLERIAN AND WOLFFIAN

E. SMITH AND A. STRASBERG

Canad. M. A. J., 55: 119-121, 1946

Three cases of subvesical cysts are presented by the authors, 2 in the male and one in the female. From an embryological standpoint, retrovesical and subtrigonal cysts in the male are remnants of the Müllerian duct, and in the female of the Wolffian duct. In the early fetus both Müllerian and Wolffian ducts are present. In the embryo of 3 months sex is established and the ducts of the opposite sex are atrophying. The only remnant of the Müllerian ducts in the adult male is the utricle in the prostate. Occasionally, remnants of the distal parts of the Wolffian ducts persist in the female; their openings are sometimes in the vulva or vagina. Eight cases of Müllerian duct cysts have been reported in the literature, and to these are added the 2 male cases in the authors' paper. A review of the literature does not reveal any subtrigonal cysts occurring in the female, and the present case is believed to be unique.

A 3½ year old female presented complaints of painful micturition, 2 months; pyuria and dysuria; hematuria, 2 days. Cystoscopy revealed a plum-sized elevation on the right side of the trigone displacing the ureteral orifice laterally. Intravenous indigo carmine showed no accessory ureteral orifices. Retrograde and intravenous pyelograms revealed a normal left kidney but a hydronephrotic right kidney. Cystogram showed a filling defect to the right side of the base of the bladder. Through a midline suprapubic incision the bladder was opened at the vault. To the right of the trigone was a spherical body with a wide pedicle. About 30 cc. of cloudy fluid was aspirated from the cyst prior to its excision level with the floor of the bladder. Intravenous pyelogram 6 months later revealed a normal urinary tract. The authors believe that this was a Wolffian duct cyst.

The diagnosis of these cysts is based on symptoms, cystoscopy, cystogram, intravenous pyelography and barium enema. The symptoms are usually those of bladder neck obstruction. In the male the mass is usually symmetrical; in the female it may lie more on one side of the midline. Visualization of the upper urinary tract may reveal dilatation of the ureter and pelvis, unilateral or bilateral. These cysts should be differentiated from ureterocele

is fitted in place to form a floor to the fistula, which is only barely depressed below the level of the bladder base.

The cystotomy is closed and a mushroom type catheter, No. 22 to 28 size, French, is placed in the highest portion of the incision. Just above the catheter a chromic catgut suture is passed through the bladder wall and each end is then put through the recti and fascia at a slightly higher level. When, during closure of the abdomen, this suspending suture is tied, the cystotomy is thus held high and against the recti.

Postoperatively, the patient is kept abdomen down up to 10 days. The suprapubic tube is gently irrigated twice daily. The addition of low pressure "bubble" suction is, the authors believe, an advantage. Low pressure suction is continued for over 2 weeks, followed by straight drainage for 2 days. When the tube is removed voiding usually begins within a few hours. The patient is discharged after the suprapubic area has been dry for 24 hours.

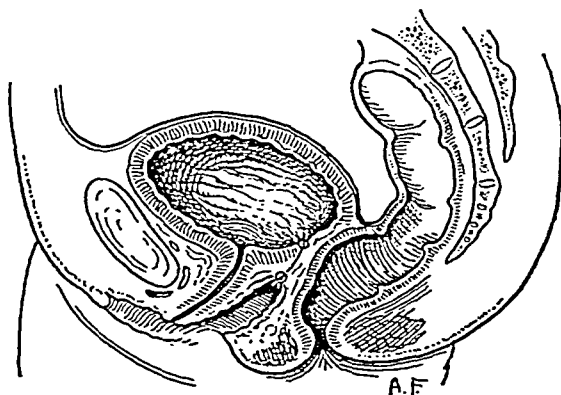


FIG. 7. Sagittal section showing end result. (Cystotomy tube not illustrated.) (Twombly and Marshall.)

This plan of operation is to be used only where residual cancer is ruled out, where the uterus and cervix are removed, or clearly obliterated, and where the urinary status after fistula closure would be expected to be satisfactory. Sexual activity after the operation is possible.

The successful result in each of the 3 cases presented in this paper, considering the unfavorable preoperative condition, seems to indicate the value of the method. 8 figures.

(In the great majority of vesico-vaginal fistulas satisfactory closure is obtainable by operations from below, though the operations may be difficult, and presuppose experience, proper preoperative preparation, careful technic, and meticulous postoperative care. The two biggest helps in the more difficult cases, usually those high up in the vaginal vault, are free mobilization of the bladder and exteriorization of the fistula by means of the Schuchardt incision.

However, in the occasional case, especially when the fistula impinges upon the ureteric area, the transvesical route may properly come up for consideration. The combined



## RETENTION CATHETER

W. T. KENNEDY

Am. J. Obst. &amp; Gynec., 52: 506-507, 1946

A retention catheter is described which is made of vitallium, a non-electro-active, nonirritating alloy which has been used in human tissue with no evidence of corrosion. This catheter has connected to it a holder, made of vitallium, which is inserted into the vagina. Iodoform gauze is packed into the vagina by this holder. The catheter connects with a piece of rubber tubing, sufficiently long to permit the patient freedom of movement in bed. This portion of tubing is joined by means of a glass connecting tube to a second length of rubber tubing which enters the bottle for collecting urine. Just below the glass connecting tube, the tube leading to the bottle is pinned to the center of the bed, preventing traction on the catheter.

The author has used this catheter for more than 3 years, with no instances of corrosion or stoppage. Should evidence of bladder infection be manifest, the tube may be separated at the glass connecting tube and the bladder irrigated without removal of the catheter. Bleeding from vaginal incisions may be controlled by insertion of the holder and gauze, and the gauze will remain uncontaminated for a week or more. The author leaves the catheter in from 7 to 10 days. Upon its removal the incisions, undisturbed while the catheter has been in place, are firmly united, and no trauma has been inflicted on urethra or bladder, even by the retention catheter. 2 figures.

(Most gynecologists employ retention catheters after the more extensive plastic procedures, and aside from the advantages, they add greatly to a patient's comfort, avoiding the severe pain which even moderate distension may entail in patients in whom fluid intake is purposefully high. Moreover, they spare the patient the necessity of being "poked at", as some of them express it, with catheters in the hands of nurses who may not be very expert in catheterization.

After cystocele operations especially, the urethra is often retracted, and even a well trained nurse may not find it easy to insert the catheter without some trauma to the patient. While the simple catheter or one of the mushroom type is ordinarily employed, these do at times get plugged, they occasionally slip out, and they do tend to limit a patient's mobility.

The rather ingenious appliance described by Kennedy seems to overcome most of the disadvantages of the ordinary catheter, and it will probably appeal to all those who do not have a congenital aversion to anything which they think smacks of fanciness or over-elaborateness.—Ed.)

and prostatism. Treatment consists of radical excision of as much of the cyst as possible; suprapubic cystotomy appears to be the easiest approach. In the literature reviewed there were no recurrences. 7 figures.

(It seems likely that the rare subtrigonal cyst reported in this paper was correctly interpreted as of Wolffian duct origin. The cysts of Wolffian duct origin with which the gynecologist is much more familiar are those which are formed in the vaginal wall, usually in its anterolateral portion. Much less frequently the terminal derivatives of the Wolffian duct produce cysts in the anterior portion of the vulva, often in the vicinity of the clitoris.—Ed.)

## GIANT URETHRAL CALCULUS IN THE FEMALE

N. C. LAKE

Brit. M. J., 2: 328-329, 1946

Urethral calculi are not only uncommon, but the majority of recorded cases have been in the male. The present case concerns a multiparous woman, aged 60 years, who for more than 3 years had complained of increasing discomfort and pain in the urethral region. For more than a year she had had dysuria, leaking incontinence and pain on sitting. Because of uncertainty in diagnosis and reluctance of the patient to submit to investigation, more than 3 years had elapsed before she was referred for further investigation.

The patient had great difficulty in passing urine, yet there was continual dribbling incontinence. In the anterior vaginal wall about an inch above the external meatus was a large (tangerine-orange) swelling which was thought to be too hard even for a carcinoma. X-rays and the passage of a probe confirmed the suspicion of a calculus.

The urethra was incised upwards through the vaginal wall to the greatest point of the swelling and the calculus was gently detached and removed. The entire stone had lain within the tremendously distended urethra. The urethra was closed down to the meatus, a catheter was left *in situ* for a few days, and 9 months later there was only a slight degree of stress incontinence.

The stone weighed 29 g., and a surface scraping revealed pure phosphate with a small amount of albuminous binding material, but x-ray showed that the central nucleus was composed of a denser material, possibly oxalate. Since there was no evidence of pre-existing pathology in the urethra or of any vesical calculus, it remains an enigma how the stone formed and why it was not passed earlier. 2 figures.

(A urethral calculus the size of a tangerine is "some" stone! I wonder if anyone can top this.—Ed.)

## OPERATIVE GYNECOLOGY

## CONSERVATIVE GYNECOLOGY

A. E. HERTZLER

Am. J. Surg., 72: 147-152, 1946

The author's purpose in writing this paper is to stress the importance of conserving the menstrual function in women. If endometrial tissue must be preserved in order to insure the integrity of the ovaries, it follows that the entire uterus must not be removed for tumors of any size during the menstrual life of the patient. The requisites for a conservative operation are to know that it can be done and the will to do it, and a knowledge of pathology.

The writer's technic for preserving a part of the endometrium is described and illustrated. The entire endometrium, including the cervical canal, is explored. An area of endometrium is circumscribed, the pathologic lesions are removed, and the enclosing uterine wall is trimmed off to fold over the preserved section of endometrium. The first line of sutures is placed just above the preserved endometrium and the remaining uterine wall is coaptated in order to control bleeding. The ends of the tubes and round ligaments are drawn together. The most important point is that the uterine flaps must fall together. If the sutures must be pulled on to bring the flaps together, they will tear out. This is obviated by covering the suture line in the uterine wall with round ligament and the adjacent peritoneum. By judicious suture application the uterus is held in normal position.

The question of hysterectomy or panhysterectomy is discussed, the author alluding to the cervix as the "handle of the pan." The argument for panhysterectomy has been that cancer may develop in the remaining cervix. This is believed to be a delusion, the author having seen only one such case wherein the patient presented a well developed cervical cancer 3 months after a supracervical hysterectomy for myomas. The point is made that the cervical canal should be explored before the lesion of the uterus is attacked. 6 figures.

(The author of this paper has died since its publication. He was a well known surgeon who had led a rather remarkable life and who had built up an important surgical centre in a small town in Kansas. He was a real personality, and had achieved fame through the writing of several popular books, one of which, "The Horse and Buggy Doctor", was for a long time in the best-seller class. He was also a prolific contributor to surgical literature, his most important work being probably his valuable monograph on "The Peritoneum".

Not all of Dr. Hertzler's ideas on gynecological subjects, in which he was always much interested, were favorably received by gynecologists, and I do not believe that many will wish to adopt the procedure described in the present paper, laudable as its conservative purpose may be.

Nor will there be any general acceptance of his obvious preference of subtotal over total hysterectomy. It is remarkable that a man of Hertzler's long and rich experience

AIR CYSTOSCOPE WITH A UNIVERSAL HANDLE AND  
EXTERNAL LIGHT

BENJAMIN LEFF

Am. J. Obst. &amp; Gynec., 52: 505, 1946

The author describes a cystoscope in which the light is attached to the universal handle outside the bladder. It is derived from a flashlight bulb and is reflected into the viscus through the cystoscope by means of a ground lens. A small adapter, enclosing the cord terminals, is inserted into the socket of a flashlight battery, eliminating the necessity for a rheostat. 2 figures.

(To the gynecologist who has trained himself in the use of the head mirror with a good reflected light, it is difficult to believe that any form of attached light, whether within or without the bladder, would be an improvement. My own experience has been entirely with the former method, popularized many years ago by Howard A. Kelly, and this, it seems to me, gives far more flexibility of manipulation than could be had by a light attached to the handle of the speculum.—Ed.)

On the other hand, it was used effectively during the course of a plastic operation to cheek oozing not readily controlled by ligature. It was effective in controlling hemorrhage from biopsy wounds and from the crater of a carcinomatous cervix. Its most valuable application in this series of cases was in a group exhibiting violent secondary hemorrhage some days after operation. 1 figure.

## FIBERGLAS PACKS IN PELVIC SURGERY

R. G. McMAHON AND F. U. DARBY

New Orleans M. & S. J., 98: 523-524, 1946

The authors believe that the adoption of fiberglas cloth packs in all types of surgery requiring packing or walling off of the intestines or adjacent viscera will materially decrease the incidence of postoperative adhesions. The disadvantages of hot, wet, absorbent surgical gauze material for laparotomy packs lie in traumatic, mechanical peritonitis and in thermal injury to the viscera. Fiberglas is an inorganic, non-toxic, non-allergenic, non-sensitizing and chemically stable substance which produces no harmful effects upon human tissue. It is pliable and possesses great tensile strength and a high degree of dimensional stability. Fiberglas has a marked resistance to high temperatures, to acids (except hydrofluoric acid), steam and corrosive fumes. It is non-hygroscopic; the material adsorbs but does not absorb moisture. Adherence or trauma to the intestines is impossible due to its physical characteristics. When used dry and at room temperature, the thermal factor of trauma is eliminated.

The authors suggest that the incorporation of fiberglas radio-opaque tracer threads in the packs and the concomitant use of small sponges with similar tracer threads will relieve many surgeons' minds in the event of postoperative complications of questionable and unexplainable etiology.

in pelvic surgery had seen only one case of stump carcinoma, which in this case had obviously been present at the time of the supravaginal hysterectomy. Not that this is the only advantage of the total technique, which seems now to have established itself as definitely the method of choice.

The arguments pro and con have been reviewed so many times that it is not necessary again to comment upon them here. There is no doubt that the total operation is, in general, a bigger operation than the subtotal, with a slightly greater hazard, in spite of the reports from some clinics, and in spite of the fact that in many individual cases it is about as simple as the supravaginal technique. However, even the most expert gynecologist will in some cases select the supravaginal operation when panhysterectomy would be prohibitively difficult or hazardous. For the inexperienced or occasional operator the supravaginal operation will usually be safer. When the cervix is to be left it should be meticulously examined and, when indicated, it should receive proper treatment, usually by some such simple procedure as cauterization or conization.—Ed.)

## ABSORBABLE (OXIDIZED) GAUZE AS A HEMOSTATIC AGENT IN GYNECOLOGIC SURGERY

W. E. STUDDIFORD

*Am. J. Obst. & Gynec.*, 52: 495-499, 1946

Oxidized cellulose, while it has been used with thrombin solution, appears to be a hemostatic agent in its own right, and its capacity for producing hemostasis without thrombin makes its application simpler than in the case of gelatin and fibrin preparations. Its most important quality from a surgical point of view lies in its slow solubility. Its greatest disadvantage is that it disintegrates in the autoclave and withstands boiling for only 3 minutes. Therefore, it has been subjected to formaldehyde sterilization. Oxidized gauze is not irritating to tissues and is readily absorbed.

During the past 10 months oxidized gauze has been used in 30 cases to control hemorrhage. Fifteen of these cases were abdominal gynecologic operations and 15 were vaginal operations. In the abdominal series, when bleeding was difficult to control by clamp and ligature, absorbable gauze was found to have a definite place as a hemostatic agent. Its application to the area of bleeding followed by momentary digital pressure was usually successful and, when hemorrhage recurred upon removal of digital pressure, satisfactory results were achieved by superimposed ordinary packing. The latter material was removed in 24 hours with no recurrence of bleeding following its removal. The early complete removal of plain packing was a great advantage. No reaction could be traced to the leaving of varying amounts of oxidized gauze within the abdominal or pelvic cavities.

During vaginal procedures the gauze also proved useful. It sometimes proved ineffective when applied to the oozing incision of completed plastic operations, but this should be regarded as a faulty application. The gauze must be placed in direct contact with the bleeding vessels under pressure to cause hemostasis.

contraception? This is not the case in certain groups who have no understanding of the relation between intercourse and conception. Some peoples do use herbs for contraceptive or abortive purposes, but Himes has concluded that these herbs cannot have the effects ascribed to them. There is no evidence that early and indefatigable sexual life or the free mixing of lovers would produce adolescent sterility.

There is evidence which supports the view that in the females of the mouse, rat, cow, macaque, chimpanzee and man, reproductive ability is not, in the majority of cases, synchronous with the appearance of the first estrus. Before ovulation can take place, the endocrine system and the soma must reach a certain level of development, and when it is reached, the organism is then said to be *nubile*. Puberty and nubility are 2 different developmental stages, and the interval between them is termed the adolescent sterility interval. Puberty is characterized by the appearance of the first estrus and the gradual development of secondary sexual characteristics. Physiologically, the pituitary elaborates the follicle stimulating hormone which causes the ovary to produce estrogen. At this stage the organism is generally sterile. Nubility is characterized by the establishment of ovulation. Physiologically, a second hormone is secreted by the pituitary, the luteinizing hormone. This acts upon the ovaries in such a way as to cause the liberation of an ovum, leaving behind its follicular investment which, under the influence of prolactin, undergoes reorganization into a luteal body whose secretion, progesterone, prepares the uterus for pregnancy. The duration of the sterility interval in mouse, monkey, chimpanzee and man would appear to be, respectively, one month, 12 months, 4 months to more than 2 years, and one month to 7 years. In man the interval between puberty and nubility is, on the whole, extremely variable. In humans, when conception does take place during the adolescent sterility interval, there is generally a high infant and maternal death rate, or high spontaneous abortion or miscarriage rates.

(This is an extremely valuable paper to those interested in the relations between menstruation and ovulation. The author has brought together a mass of observations, chiefly on primitive peoples, to substantiate the thesis that the early menstrual cycles are frequently of anovulatory type, and quite the same observations are applicable to our highly civilized groups, as various authors have reported. For example, Mikulicz and Klaus studied a large series of cases in the Berlin Frauenklinik, made up of young illegitimately pregnant girls who had been leading promiscuous and unprotected sex lives for a number of years, without the occurrence of pregnancy until after variable periods, often several years, after the menarche. However, aside from such rather circumstantial evidence, there are at least some available data to the same effect based on good histological evidence. The high incidence of anovulatory cycles in the early menstrual life of monkeys has of course long since been clearly demonstrated by the studies of Corner and Hartman.

It must not be assumed, however, that this is the rule with either human females or monkeys, because ovulation often occurs with the very first cycle. As a matter of fact, there is simply not enough statistical information available as yet as to the proportionate incidence of the two types of cycle in human females.

The frequency of anovulatory cycles in the puberal and early adolescent years is of importance from several practical standpoints. Such cycles, being of incomplete, more primitive character than ovulatory cycles, are also more unstable, so that they far more

## STERILITY

### ADOLESCENT STERILITY IN THE HUMAN FEMALE

M. F. A. MONTAGU

Human Fertil., 2: 33-41, 1946

Evidence is presented which suggests that puberty, the menarche and the development of the capacity to reproduce are not synchronous events, as is commonly assumed. Menarche represents a stage of puberty, the stage of beginning (anovulatory) ovarian activity. The capacity for reproduction generally follows appreciably later, marking the termination of puberty and initiating the period of nubility. The first observers to draw attention to the phenomenon of infertility of adolescent human females have, in this century, been ethnologists.

Working among simpler societies, ethnologists have been puzzled by the fact that the unmarried post-pubertal females, despite free and frequent intercourse with mature males, rarely become pregnant. Rivers, in 1926, found that among the Eddystone Islanders of Melanesia, in spite of very free relations existing before marriage, births as a result of premarital intercourse were exceedingly rare; only one case was given in the whole of the pedigrees obtained by this worker. Among the Trobriand Islanders of North-Western Melanesia, Malinowski was able to find about one per cent of illegitimate children recorded genealogically. These people never practice *coitus interruptus* and have no notion about chemical or mechanical preventives. Abortion probably is not practiced to any large extent.

Among the natives of Wogeo, in the Territory of New Guinea, Hogbin found that sexual life does not begin until about the age of 16 or 17 years, whereafter it is quite free. The first menstruation does not regularly occur in these natives until after the seventeenth year. Hogbin observed that illegitimacy is not nearly as common as would be expected, and that even when a girl is married immediately after her first menstruation, it is very unusual for her to have a child for several years.

Ford, writing of the natives in the D'Entrecasteaux Islands, states that it is considered disgraceful for an infant to be born to a single girl, and although there is sexual freedom among young unmarried people in some parts of the islands, pregnancy rarely results. Similarly, in a region of Luzon, illegitimacy is rare and much frowned upon, yet adolescents of the various families sleep together, free to mix as they wish, with no parental attention whatever to their sexual relations. Various other workers are quoted, who have made similar observations.

The author discusses the questions which these observations raise. Can this apparent infertility of the adolescent female in simpler societies be explained by



oped filter and preserver for those sperms which satisfy certain conditions. When the cervical mucus is found to be normal, or nearly so, and sperm invasion still fails, artificial insemination may be considered.

The vast subject of endocrine dysfunction cannot be discussed in this paper. In regard to treatment, however, the author mentions microcrystalline suspension of estrogenic hormones and combined chorionic gonadotrophin and anterior pituitary-like hormone, in the compound synapoidin, as useful preparations. Irradiation therapy of the pituitary and ovaries, as a supplement to hormone treatment, has been advocated chiefly in America. The Kaplan technique for ovarian irradiation has proved of some value in severe cases of amenorrhea. Another aspect of the endocrine side of the problem is the relation between fecundity and body temperature; this is recognized as an important factor in dating ovulation, and so determining the optimum time for coitus.

(This review expresses opinions not differing materially from those generally held, except perhaps for one or two points. It is rather surprising to read that in the study of sterile women "it is rare to find an endometrium which shows no sign of progestational change", indicating that the author considers anovulatory cycles rare. I do not believe that most gynecologists will subscribe to this, although they may differ quite widely in their impressions as to the incidence of such cycles. As to the general reliability of endometrial biopsy as an ovulation test, there appears to be little difference of opinion, in spite of one or two possibly vitiating factors which have been suggested, such as the possible occurrence of luteinization and progesterone production without the giving off of the egg. Such objections appear thus far to be only theoretical rather than real.—Ed.)

## MALE INFERTILITY

T. N. A. JEFFCOATE

Brit. M. J., 2: 185-191, 1946

How often is the male partner responsible for an infertile marriage? It is difficult if not impossible to give a concise answer to this or even to form an exact estimate. Actually, a man or woman is not sterile until he or she dies without issue. There are 3 important reasons for this. First, fertility is a matter of relativity. Few people are absolutely sterile or fully fertile, and all intermediate grades of fertility occur in either sex. Low fertility in one marriage partner, barring sterility, may be cancelled out by high fertility in the other. Second, usually infertility results not from one, but from several factors (average per case, between 2 and 4). The wife may have cervical erosion and uterine retroflexion, while the husband's spermatozoa may be subnormal in number and quality. Third, assessment of male fertility is in itself difficult.

In this study of male infertility which was conducted on a total of 795 individuals, 320 private and 115 hospital cases were assessed as to their fertility. This was done by the following methods: (a) The Procreation Test. This is

frequently exhibit aberrations. As a matter of fact, it is just this type of aberration which is concerned in the production of the very common functional bleedings of this age period.

To add one very unimportant comment, the author states that nubility is characterized by the establishment of ovulation. However, the accepted definition of a nubile woman is that she is one who is marriageable. There are many "marriageable" women who do not ovulate, and the same thing is true of many who have been married for many years.—Ed.)

## INFERTILITY IN WOMEN

C. LANE-ROBERTS

J. Obst. & Gynaec. Brit. Emp., 53: 148-153, 1946

The interpretation of results from the examination of the subfertile woman usually locates one or more subfertility factors among the following groups: (1) pelvic pathological lesions, either inflammatory or neoplastic; (2) cervical factor (nature of plug of mucus and reception of spermatozoa); (3) tubal factor (possibly lack of function, of occlusion or of spasm); (4) female endocrine aspect.

The vaginal fluid should be examined to exclude trichomonas vaginalis, or monilia, and to find the pH value. The vaginal smear may be helpful in estimating ovarian activity, in assessing the effectiveness of hormonal preparations and in determining ovulation. Thus far, this method has not been employed as extensively in the author's country as in America.

Caution is stressed in the performance of tubal insufflation, in respect both to the presence of inflammatory disease and the optimal time in the menstrual cycle. Normal patency is demonstrated when the pressure reaches 60 to 120 mm. Hg., and then rapidly falls. Stenosis is demonstrated when the escape pressure is high, the fall slow, and repetition of the test gives a similar result. The result of a single insufflation showing apparent non-patency cannot be depended upon. In respect to therapeutic value, Sharman, in his series of nearly 500 cases, found that of the ensuing pregnancies, 36 per cent conceived in 3 months and 50 per cent in 6 months.

There is no doubt that a higher percentage of patients become pregnant after hysterosalpingography than after tubal insufflation. Malpas says "both procedures . . . are complementary the one to the other and essentially diagnostic. Their use as primary therapeutic measures is likely to lead to many disappointments."

It is rare to find an endometrium which shows no sign of progestational change, although in many this appears to be inadequate or incomplete. Endometrial biopsy does not seem to provide a complete answer to the question of whether ovulation has occurred, but it provides important information about ovarian function and endometrial response.

The post-coital test is discussed. Barton and Wiesner believe that the cervix does not function merely in a mechanical way, but that it acts as a highly devel-

## MALE INFERTILITY

K. WALKER

J. Obst. &amp; Gynaec. Brit. Emp., 53: 154-157, 1946

The importance of examination of the male partner of an infertile marriage is emphasized by the probability that in  $\frac{1}{2}$  of all barren unions the male is mainly responsible and in  $\frac{2}{3}$  of them his infertility is a contributing factor. The preliminary investigation should include a careful history, particularly in regard to past illnesses and recent gross infections, occupation and mode of life and habits. The husband should be questioned as to the frequency and effectiveness of intercourse.

The author discusses a few of the main points in semen analysis. The volume is usually between 2 and 5 cc., but it has been found that there is no relationship between density of spermatozoa and volume, or volume and fertility, until the lower limits are reached. It must be remembered that conception frequently occurs with sperm counts much lower than 60,000,000, and that samples from the same patient may show great variations in density. Following determination of sperm count, motility and viability, morphology of the spermatozoa must be studied, for it is the quality rather than the number of spermatozoa that is important. If more than 25 per cent of the spermatozoa are abnormal the fertility of the husband must be suspected.

Testicular biopsy yields very valuable information. It should be borne in mind that wide variations are often found in different areas of the testis. Biopsy yields helpful information in differentiating between an azoospermia due to aspermatogenesis and one resulting from blockage of the ducts. It also permits evaluation as to the possible benefits to be gained from hormone therapy.

Treatment should be based on the findings from a general physical examination as well as the local one. Diet, habits and mode of life are of importance. Poor potency may need to be treated. Two types of hormone treatment must be considered: testosterone and anterior pituitary-like hormones. Thyroid has only a minor place in treatment. Testosterone should be used in cases of low viability, poor invasive capacity, when potency is weak and when temporary occlusion of the ducts is suspected. The author prefers an emulsion of crystalline testosterone to the usual oily solution. Unfortunately, no satisfactory and inexpensive anterior pituitary-like hormone is yet available, and the true value of such preparations is difficult to assess.

Surgical treatment plays little part in the correction of male infertility. Vaso-epididymostomy, as a means of overcoming a blocked epididymis, has attracted renewed interest, but the results obtained in the author's country cannot be called satisfactory. The author has seen no case in which the bringing down of a retained testicle in an adult has resulted in the appearance of spermatozoa in previously sterile semen.

Artificial insemination may be resorted to when the husband is suffering from

perhaps the best test if the man has been responsible for more than one pregnancy and has not had an illness or injury since the previous pregnancy. (b) Clinical Examination. This is of limited value and helpful only if the findings are positive; e.g., atrophied testes, hypoplasia, phimosis, varicocele. However, it is of some importance to know the patient's age, occupation, past history, general health and sex life. Of significance is a history of adult mumps, orchitis, gonorrhea, syphilis, malaria, phthisis, impotence or age over 60. (c) Semen Analysis. This is the test by which male fertility is mainly assessed. More than one specimen should be examined and the various features such as volume, density, motility, number, morphology and survival capacity should be considered in relation to each other rather than separately. The interpretation of semen analysis is difficult. The criteria of abnormality used with these cases have been: a volume of fluid less than 0.5 cc., or a low density making the total population less than 50 million; the number of spermatozoa below 30 million; a motility of less than 40 per cent at the end of 6 to 8 hours; and a malformation percentage of more than 50. When the sperm count was found to be 10 million per cc., or less, the impairment was considered serious. All other types of seminal faults were classified as moderate impairment only, (subfertility).

Of the 424 husbands examined in this series, 40 per cent showed evidence of subfertility. This figure is in accord with nearly all recent writers.

The types and causes of male infertility in 183 cases of this series are ascribed mainly to impotence and defects in production or delivery of spermatozoa. Impotence (13 cases) was more often psychogenic in origin; i.e., guilt over masturbation, wrong outlook on sex, religious zeal, abnormal respect for the opposite sex, and an underlying desire not to have children. The treatment consisted of education and psychotherapy. Faults in semen occurred in 169 cases, the majority being due to low sperm density, the underlying cause of which was unknown in 50 per cent. The rest were due to a number of factors such as mumps, cryptorchidism, venereal disease, varicocele, hormone imbalance (rare), x-ray exposure, herniorrhaphy, and orchitis.

The treatment of male infertility in the absence of an obvious cause is largely empirical. Some form of hormonal therapy is usually advised. In this series of cases the hormone of choice was serum gonadotrophin. This was given intramuscularly, 1000 I.U., biweekly for 3 months, or daily for 10 days and then repeated. Fourteen cases so treated showed an improvement in spermatogenesis; however, the results were not conclusive. Artificial insemination, using the husband's semen, was employed in 6 cases. Two women have had children as a result and a third had an ectopic pregnancy.

Of the 183 cases of male infertility studied and treated in this series, 30 patients have since been responsible for at least one pregnancy.

### 5. Injection with excessive force.

The author reports 6 cases of this accident, in an attempt to discover if and where the above rules were neglected. In Case I, owing to a misunderstanding, the operation was carried out just after the end of a menstrual period. X-ray showed intravasation of dye to the pelvic veins. A lung x-ray showed fine flecks of scattered lipiodol. The patient suffered no ill effect, although after returning home she experienced prolonged irregular vaginal loss, followed by a heavy "period", suggesting a mild pelvic inflammatory condition.

In Case II the operation was carried out 4 to 5 days before the expected onset of the period, and it is possible, also, that excessive pressure may have been used. The degree of intravasation of the pelvic veins was remarkable. No ill effects followed.

Cases III, IV and V were carried out within a week or two of each other by the author. All the conditions for safety were fulfilled, and it is concluded that possibly the cervixes were traumatized by a new, rather rough-surfaced rubber covering to the cannula. In each case the x-ray after injection of the lipiodol showed venous intravasation. All 3 patients developed hemoptysis. Chest x-ray in each case suggested minute pulmonary infarcts. The end result in each case was good.

In Case VI all conditions for safety appeared to be fulfilled, but x-ray showed venous intravasation to both iliac veins. Subsequent history and x-ray findings were as in previous cases.

The writer comments that while few, if any, consequences ensue from this complication, some have been dangerous and even fatal. 7 figures.

(A good many of these cases of venous intravasation following intrauterine lipiodol injection have been reported, no less than 35 having been collected in the recent paper of Roblee and Moore (South. M. J., 38: 89-94, 1945). In this paper one will find an excellent discussion of the subject, and there is also a good comparison of the relative hazards of hysterosalpingography and tubal insufflation in the even more recent paper by Miller (J. A. M. A., 129: 243-246, 1945). The latter states that at least 9 deaths have followed the former method, though most of them were not due to intravasation. As a matter of fact, there is some difference of opinion as to the dangers of intravasation, though fatalities may occur.

Not all of the 5 conditions enumerated by the author as predisposing to intravasation would seem unquestionable. For example, she mentions among them injection within 8 days after the termination of menstruation. The endometrium is certainly fully re-stored and quite intact long before this. With the other 4 factors mentioned, there will be more general agreement.—Ed.)

incurable impotence and in certain cases of oligozoospermia and asthenozoospermia.

In conclusion, the author states that until more of the factors responsible for infertility are discovered, treatment of the male cannot be said to be satisfactory.

(One of the most important modern advances in the study of sterility is the recognition of the great frequency of the masculine factor, and the incentive which this has given to studies of the semen as correlated with various degrees of infertility. The author's estimate that  $\frac{1}{2}$  of barren unions are explainable by the male factor is too low, and I believe that most students of the subject would put it at  $\frac{1}{3}$  or even more.

On the other hand, we have had to revise some of our former tenets as to the significance of certain semen findings, especially the sperm count. At one time it was held that a count below 60,000,000 was reasonably good evidence of infertility, while now we know that many men of undoubted and demonstrated fertility have counts far below this figure. More recently greater importance has apparently been attached to the proportion of abnormal head forms, and again a working rule has been set up, with an incidence of 20 to 25 per cent of abnormal forms as a sort of dividing line between fertility and probable non-fertility. It is not certain that this attitude is a final one.

In a very recent study by a leading student of the subject (Hammen, R., *Human Fertil.*, 2: 65, Sept., 1946) the suggestion is made that a high incidence of abnormal forms may be due to the fact that such abnormal forms may have their source in localized areas of pathological testicular parenchyma, which histologists have found to be quite common in the human testes, even though these are otherwise essentially normal. Again, the estimation of abnormal forms must of necessity introduce the individual factor, and a reasonably reliable one presupposes that the examiner be well trained in seminal cytology, which is not always the case.

As for organotherapy in the treatment of seminal insufficiency, there is little reason for enthusiasm. General measures are of course of some importance. Testosterone is not a stimulant of spermatogenesis, and its use may actually be harmful, though for certain special indications it might be rational. Gonadotrophes of one sort or another have been disappointing, and, in my own experience, thyroid therapy is more often of value, though its use is often just as empirical as it is in the somewhat corresponding germ cell deficiencies in the female.—Ed.)

## SIX CASES OF VENOUS INTRAVASATION FOLLOWING INTRAUTERINE LIPIODOL INJECTION

ALICE BLOOMFIELD

*J. Obst. & Gynaec. Brit. Emp.*, 53: 345-346, 1946

The conditions which are said to predispose to venous intravasation following lipiodol injection into the uterus are as follows:

1. Injection within 8 days after termination of menstruation before full regeneration of the uterine mucosa has taken place.
2. Injection immediately following cervical dilatation.
3. Injection too soon after curettage to allow regeneration of the mucosa.
4. Injection just prior to menstruation, when the congested and edematous mucosa readily allows traumatization.

## MISCELLANEOUS

### SOME GYNAECOLOGICAL ASPECTS OF REFERRED PAIN

G. W. THEOBALD

J. Obst. & Gynaec. Brit. Emp., 53: 309-327, 1946

The author presents evidence which proves that the uterus, an abdominal viscus innervated by the sympathetic nervous system, is supplied by sensory nerves. Pain may be produced by the application of the volsellum to the cervix, removal of tissue from the external os, insertion of a ligature and curettage of the uterus. Uterine pain is a referred pain, and there is no evidence of any deep localized uterine pain (the splanchnic type of Ross). The quality of the pain is of the deep type. Uterine pain is always referred to areas of skin supplied by branches of the first lumbar nerve, and can usually be abolished by anesthetizing the cutaneous areas to which it is referred. The pain arising from or provoked in the uterus probably affords the most accurate delimitation of the first lumbar dermatome.

About 10 years ago the author began to treat endocervicitis by the application of a stick of silver nitrate, and this method of treatment has afforded a simple means of provoking and studying pain referred from the cervix and body of the uterus. The pain thus induced in no way differs from that of dysmenorrhea and labor. It is probable that the endometrium is as sensitive, if not more so than the cervical mucosa to this stimulus. A remarkable fact about this treatment is that it causes intolerable pain in some women and none in others.

It was found that the cervix is not an inert structure, for the introduction of the silver stick frequently causes it to evince marked spasm. This spasm disappears in about 30 seconds. Pain is not usually experienced during the spasm but commences after the internal sphincter relaxes. Thus, the degree of dilatation of the internal os is a significant factor in the degree of pain produced by this treatment. The social status of the patient is also important; the author noted a marked difference in the incidence of pain subsequent to treatment between the hospital and higher class of patient, the latter group requiring anesthesia. Further, the amount of free silver liberated from the stick depends largely on the amount of fluid present, which in turn is determined by the thickness of the mucosa and amount of secretion. The pain will therefore be more severe if the treatment is carried out shortly before a menstrual period.

The onset of the pain usually occurred within 2 minutes of the application of the silver stick. In nearly all cases it began in the mid-line, about one-third of the distance from the symphysis pubis to the umbilicus. From there it spread to involve the entire lower abdomen below a line drawn between the 2 anterior superior iliac spines. Three other sites which were commonly involved

## SIMPLIFIED APPARATUS FOR INSUFFLATION OF THE TUBES WITH CARBON DIOXIDE

J. T. SMITH

Am. J. Obst. &amp; Gynec., 52: 501-502, 1946

The small rural hospital and country physician are not usually equipped with the necessary apparatus for making the Rubin test. The syringe and cannula suggested by Dr. Jacoby (Am. J. Obst. & Gynec., 39: 156, 1940) seemed ideal for the physician wishing to perform only a few tests a year. However, death from air embolism has been reported following tubal insufflation with atmospheric air.

To overcome this objection, a suction flask has been cut into the tube from the cannula to the manometer. In this flask is placed a heaping tablespoonful of sodium bicarbonate. A separation funnel is attached to the mouth of the flask through a rubber cork, and about 10 per cent citric acid is placed in the funnel. A stopcock at the base of the funnel controls the dripping of the acid on the sodium bicarbonate. With the finger closing the cannula tip, the piston of the syringe (attached to cannula) is slowly drawn out, filling the barrel with carbon dioxide from the flask. A sterile clamp is snapped on the side tube leading from the flask to the "T" tube which connects with both manometer and cannula. The tip of the cannula is placed in the cervical os and the test carried out as directed by Jacoby. Pressure is obtained by gently pushing the piston of the 30 cc. syringe. This simple apparatus eliminates the need for tanks or other source of carbon dioxide. 1 figure.

(A first glance at the photograph of the apparatus devised by Smith made me think at once, I must confess, of one of Goldberg's inventions, of cartoon fame. I suppose it is simple enough, but certainly not as simple as the Rubin apparatus itself. Under normal conditions (I believe that this has not been so during the war emergency) the latter is easy to get and comparatively inexpensive. All sorts of simplifications of the test have been suggested, but one has the feeling that none of them offer any advantage, unless the Rubin apparatus is simply not obtainable.—Ed.)



mesenteric lymphangioma, from a study of reported lymphatic tumors, is an extremely rare type of a rare group. It is composed of small lymphatic cysts and sinuses with fatty compact areas, and associated edema, hemorrhage and necrosis.

The most common complication is intestinal obstruction, frequently followed by peritonitis. The treatment of these cysts is surgical; simple enucleation, when possible, carries the lowest mortality of all forms of surgical interference.

In the present case, a 49 year old woman was referred to the author with a diagnosis of an acute abdominal condition. She had been treated for a secondary anemia for one year. Menstruation had stopped completely 5 months previously. Several days before admission she bled heavily, with abdominal cramps, gas pains and flatulence. She was seen with acute, very severe lower abdominal pain, nausea and fever.

The temperature was 101 degrees F., pulse 98. The abdomen was distended and flatulent. There was extreme generalized abdominal tenderness, especially in the right lower abdomen. Abdominal palpation was actively resisted. The uterus was large and nodular with numerous fibroid tumors. There was blood in the vagina. A diagnostic curettage revealed adenocarcinoma of the uterus. Obstructive symptoms appeared on the day that the report from the curettage was received.

At operation a large nodular mass was found in the mesentery of the small intestine. It was a cystic intramesenteric tumor, the size of a large grapefruit. A length of small intestine was draped, ribbonlike, over the mass and inseparable from it. The uterus contained good-sized fibroid tumors throughout. There was no indication of cancerous extension into the adnexa or broad ligaments. A radical procedure was decided upon.

The entire mesenteric mass was removed with about 18 inches of the overlying intestine. The mesentery was resected to its base, the bowel ends were closed and inverted, a side-to-side isoperistaltic intestinal anastomosis was performed, and the mesenteric defect repaired with fine chromic sutures. A radical panhysterectomy was then performed. Recovery was satisfactory.

The pathological diagnosis of the 2 specimens was early adenocarcinoma of the fundus, multiple fibromyoma uteri with uterine sclerosis, and lymphangioma of the mesentery.

The author stresses the value of radical surgery for an otherwise hopeless condition. 2 figures.

(The author is to be congratulated upon the successful outcome in this case, after such a formidable procedure as the combined operation which was carried out. His report emphasizes the point that the gynecologist must be prepared to deal with any intraabdominal condition which he may encounter. No matter how thorough the preoperative study, every gynecologist is sure from time to time to meet with non-gynecological pelvic or abdominal conditions which have simulated diseases of the female generative organs, or which complicate them and call for proper treatment then and there. He cannot always have at his elbow a general surgeon who will take over the burden, and it is unfair and sometimes hazardous to the patient to leave such conditions for a second operation.

In many otherwise excellent gynecological services the training is often so sharply

were the back, over the iliac crest, and down the inner sides of the thighs. It is to these same areas that the pains of dysmenorrhea and labor are referred, and the skin in these areas is supplied by branches of the first lumbar nerve. Tenderness to deep palpation over the tip of the transverse process of the second lumbar vertebra, particularly on the left side, is almost invariably elicited in women who suffer from dysmenorrhea. The dysmenorrhea can often be relieved for some months by one or more applications of the silver stick to the cervical mucosa.

Pain from the ovaries and fundus of the bladder is likewise referred to cutaneous areas supplied by the first lumbar nerve. The bladder pain is localized to the center of the lower abdomen, while ovarian pain is usually limited to the side of the offending ovary. Chronic ovarian pain may frequently be cured by treating the cervical mucosa with the silver stick.

The author concludes that abdominal rigidity rarely, if ever, occurs apart from pain, and is abolished by a procedure which abolishes the pain. This fact supports the view that the sensorium is involved in the "viscero-motor reflex." 4 figures.

(Those who have been interested in the problem of visceral pain are no doubt familiar with the classical observations of Henry Head, as well as those of Lennander, and the present author's views represent an adaptation of these to the explanation of certain types of gynecological pain. It will be recalled that the above mentioned investigators looked upon the visceral peritoneum as insensitive to pain, pain stimuli in the viscera being referred to the corresponding segment of the somatic nervous system. For example, a patient with acute appendicitis does not really perceive the pain in the appendix, but in the somatic nerves of the overlying parietal wall. This mechanism is explained by the neurological phenomenon known as *allocheiria*.

Efforts at diagnosis of visceral disease by outlining the cutaneous areas which are hypersensitive have been made, but do not seem to have established themselves as of great value. This statement applies even more to the treatment of the pain by anesthetizing the parietal zones, as has been suggested by some in the past. Incidentally, the introduction of a stick of silver nitrate into the cervical canal for endocervicitis can scarcely be considered safe treatment.—Ed.)

## MESENTERIC LYMPHANGIOMA WITH INTESTINAL OBSTRUCTION COMPLICATING UTERINE CARCINOMA AND FIBROMYOMA

E. G. WATERS

Am. J. Obst. & Gynec., 52: 478-483, 1946

Lymphatic mesenteric tumors are unquestionably the rarest tumors of the abdomen. The common concept as to their origin is that they arise from embryonic remnants and sequestered tissues in the mesentery. Usually they are congenital, yet rarely do they appear until later life. In spite of the extensive lymphatic system found in the abdomen, they are not common there. The solid

vitamins and transfusions were instituted. On the 79th hospital day the abdomen was opened by a lower right rectus incision over the abdominal mass. A huge retroperitoneal tumor was found extending from the pelvic floor to the diaphragm, originating in the left abdominal sulcus region. The pathological diagnosis of the removed tumor, which weighed 59 pounds, was myxofibroma, retroperitoneal. After a stormy postoperative course the patient was discharged on the 85th postoperative day in good health, having regained a weight of 104.9 pounds. Three months later she was readmitted for removal of the redundant abdominal skin and repair of ventral hernia. Final examination revealed satisfactory healing with good abdominal wall support. Two years and 4 months after operation the patient was in good health and weighed 164.7 pounds.

Under certain circumstances a correct interpretation of these tumors can be made beforehand. Valuable in the diagnosis is the relative fixation of the tumor to abdominal and pelvic examination. Intravenous pyelography can be very helpful in showing disturbance or absence of function when the tumor is of renal origin, and in showing a wide displacement of the ureter, and sometimes also of the kidney, by the neighboring retroperitoneal tumor. 5 figures.

(While retroperitoneal tumors are encountered only with comparative rarity by the gynecologist, they do occur, and their diagnosis is apt to be difficult, and sometimes their removal is no easy matter. Since the gynecologist is apt to come upon them unawares through an abdominal incision, their removal is apt to be transperitoneal, though an approach through the back would probably often be easier if the diagnosis has been made beforehand. On the other hand, with such a huge tumor as the myxofibroma reported by the authors, only the transperitoneal route would have been feasible. See also comment on preceding abstract of paper by Waters.—Ed.)

## PRACTICAL ASPECTS OF MAMMARY DISEASE IN THE FEMALE

C. F. GESCHICKTER

Am. Practitioner, 1: 31-36, 1946

In discussing diseases of the breast in the female, the author describes features of these diseases and suggests appropriate therapy.

Common abnormalities of the puerperium are painful engorgement and lactational mastitis. The former is best treated by oral estrogen if lactation is to be inhibited, and by testosterone if the mother plans to nurse her child. Abscess formation in lactational mastitis can usually be avoided by cessation of nursing, binding of the breasts, application of ice bags and prompt institution of sulfathiazole therapy.

The commonest mammary abnormality in women during sexual maturity is mammary dysplasia in its various forms. This group includes mastodynia, adenosis and cystic disease; recent studies indicate that the cause is abnormalities in secretion of ovarian hormones, probably insufficient function of the

limited that residents get little or no opportunity to familiarize themselves with such procedures as for example intestinal resection, and yet there are few gynecologists of experience who have not had to perform this operation from time to time, often very unexpectedly. In one of our hospitals I recently heard a couple of internes chuckling over the dismal performance of a gynecologist who had recently finished some years of excellent special training in gynecology in one of the best clinics in the country and who encountered a retrocecal gangrenous appendix in a case in which he had diagnosed a twisted ovarian cyst.

Unfortunately Waters' paper does not include a photomicrograph of the mesenteric lymphangioma, although I suppose it was of the so-called cavernous variety. The pelvic organs themselves are rarely the seat of lymphangiomatous tumors, but they do occur. I have seen two lymphangiomas of the uterus, both somewhat different from the lymphangiocystic fibroma of that organ recently reported by Plaut (*Am. J. Obst. & Gynec.*, 51: 842 (June, 1946)). I have also recently seen an instance of large lymphangiomatous cyst of the ovary. See also comment on following abstract of paper by Stromme and Stander.—Ed.)

## RETROPERITONEAL TUMORS SIMULATING GENITAL TRACT NEOPLASMS

W. B. STROMME AND H. J. STANDER

*Am. J. Obst. & Gynec.*, 52: 456-463, 1946

In 13,113 gynecologic operations the authors have found only 12 cases of retroperitoneal tumor, an incidence of 1:1093. The patients were largely of the middle age group. The symptoms were not pathognomonic and were not uniformly present. In 4 instances the correct location of the tumor was made preoperatively; in the other cases the growth was thought to be of ovarian or myomatous origin.

Many believe that tumors of the mesentery have a common origin with retroperitoneal tumors in the mesenchyme surrounding the primitive coelomic cavity. The tumors are derived from retroperitoneal organs and their anlagen or retroperitoneal connective tissues. A classification of retroperitoneal and mesenteric tumors is proposed which groups them into cystic and solid tumors and further divides the cystic tumors into neoplastic and infectious, developmental and congenital and traumatic sanguineous cyst, and the solid tumors into benign and malignant.

An unusually interesting case is presented of a 57 year old women who was admitted to the hospital with an abdominal tumor so large that she had been confined to bed for the past 18 months. A tremendously large abdominal mass was noted which measured 100 by 60 by 20 cm. The overlying skin on one side of the abdomen, groin and inner aspect of both thighs was extensively eroded and secondarily infected. The cervix was healthy; uterus and adnexa were drawn up out of the pelvis and could not be palpated. The patient was emaciated and showed evidence of weight loss.

She was allowed a 3-month period of preoperative rest, during which time the excoriated skin was treated, and fluid replacement, parenteral administration of

life, because of the hormonal influence of the ovaries upon the breast. On the other hand, it is well to remember that a definite lump developing in the breast of a woman well beyond the menopause is almost certainly a cancer.—Ed.)

## DIAGNOSTIC VALUE OF EXFOLIATED CELLS FROM CANCEROUS TISSUES

G. N. PAPANICOLAOU

J. A. M. A., 131: 372-378, 1946

In this paper the author reviews the history and development of the vaginal smear as a method of cancer diagnosis, sets forth examples of the application of the smear technic to the diagnosis of neoplasms in various body systems and discusses the advantages and disadvantages of the smear test.

In 1943 the author, with H. F. Traut, published the results of their studies on the diagnosis of uterine cancer by the vaginal smear. A statistical evaluation was presented of 193 instances of carcinoma involving the uterus and some part of the lower genital tract. A total of 127 patients had demonstrable malignant lesions of the cervix; failure to detect malignant cells in the vaginal smear occurred 4 times (3.2 per cent). In 53 patients with primary carcinoma of the fundus the percentage of failure was 9.3 per cent. The higher percentage was partly due to the relatively high incidence of adenoma malignum. Since then, Marchetti and the author have introduced the endocervical and endometrial smear technic, which is decidedly helpful in detecting cancer of the endocervix and endometrium.

A recent paper by Meigs, Graham, Fremont-Smith, Janzen and Nelson reports 1015 cases with a total error of only 4 per cent. These writers also report 8 early cases of uterine cancer diagnosed primarily by vaginal smears. The great simplicity of the test and its low cost have been a inducement to use it as a screening method for detecting early or hidden carcinomas of the female genital tract.

The smear technic has been applied to the urinary tract, being based on the detection of cells of desquamated cancerous growths in the sediment of centrifuged urine. In a series of 83 cases, 27 have been diagnosed positive for neoplasms, with one "false positive" diagnosis, or 3.7 per cent. Of the cases in which the smear was inconclusive or negative the percentage of correct diagnoses was about 60 per cent.

The smear technic has also been used for other secretions and fluids, including sputum, gastric and duodenal fluids and thoracic and peritoneal fluid specimens.

The advantages of the smear test may be summarized as follows: (1) simplicity and low cost; (2) reliability in experienced hands; (3) early recognition of incipient or hidden carcinomas; (4) can be carried out on large scale as screening method; (5) does not conflict with other established methods of diagnosis, such

corpus luteum. It is important to differentiate by palpation the dense tender tissue found in mastodynia and adenosis from the more definite mass of malignant growths, and if aspiration of a cyst reveals no evidence of blood, conservative measures are justified. In adenosis there is a significant predisposition to malignancy. Most cases of chronic cystic mastitis will improve on endocrine therapy. Progesterone therapy is recommended for mastodynia and adenosis. In cystic disease, aspiration results in permanent disappearance of the lump in about 50 per cent of cases.

Fibro-adenoma is the most common benign tumor appearing in the breast during the child-bearing age, and is characterized by its firmness, encapsulation and mobility. Intracystic papillomas are soft epithelial growths projecting into a duct or cystic cavity, and usually occur after the age of 30. Excision is indicated for both fibro-adenomas and benign papillomas. Multiple growths are best treated by simple mastectomy.

The majority of patients with carcinoma of the breast are at or near the menopause. Once the disease becomes manifest the average duration of life is 4 years. The 5 major findings on examination are: (1) presence of a single lump in a breast otherwise normal to palpation; (2) hard and irregular feeling of the tumor; (3) atrophy of overlying fat; (4) restricted mobility of the mass; and (5) flattening or retraction of skin or nipple on affected side when arms or breasts are manipulated. Surgical biopsy is indicated for any definite palpable mass. If carcinoma is diagnosed histologically, radical mastectomy should be performed unless there are definite contraindications. If the axillary nodes are found to be involved at operation, postoperative irradiation should be given. 9 figures.

(Gynecologists will profit by a reading of this article, because they must almost of necessity include the female breast in their study of gynecological problems. As I have mentioned once before, this inclusion is considered a proper and legitimate one by the American Board of Obstetrics and Gynecology. The review of mammary lesions given by Geschickter is an authoritative one, although I am not sure that everyone will endorse his statement that "most cases of chronic cystic mastitis will improve on endocrine therapy.")

My own experience has been that by far the most important measure in treatment is reassurance and simple explanation, and this is probably true simply because the fear lurking in the minds of most women is that of cancer. This apprehensiveness should never be ridiculed, but the patient's problem should be taken sympathetically and seriously, and her breasts carefully examined. If a simple chronic cystitis of mild degree is found, the doctor should take the trouble to explain in simple language how it is brought about, as well as its essentially harmless character. This in itself, with perhaps simple directions for the support of the breast, will often be all that is required. Once the woman knows she has no cancer, she is likely not to notice the twinges of pain and soreness which previously had kept her mind on the subject of cancer.

I do not think that endocrine therapy is often necessary, nor that it is advisable in most cases, since it has to be kept up for long periods of time, and it keeps the patient's mind centered on her breasts. Nor are the results all that they are "cracked up" to be.

Such a simple plan cannot always be employed, especially in the cases of diffuse proliferative or adenosis type, which often produce lumps that simply cannot be distinguished from cancer without biopsy and microscopic examination. It is in this group that, according to many excellent pathologists, there is an actual malignant potentiality. Many interesting problems in the diagnosis of breast lesions are encountered in women during menstrual

trate of as little as 800 cc. of urine from nongenital cancer in the human male. Controls of the same age were negative. Preliminary results would suggest that specific steroids and/or cytotrophoblastic prolans are present in all cases of cancer.

It would appear significant, the writers conclude, that many of the most malignant forms of cancer, as well as tumors of lesser malignancy, are found to yield a quantity of gonadotrophin, duplicated only by that produced by the trophoblast cell, and that the only cell never observed in the benign state in the male or, aside from the canalization of pregnancy, in the female is the trophoblast cell. Parallel to this is the finding in cancer of a steroid duplicated only by the syncytial trophoblast. "These data would seem further to substantiate the unitarian nature of all exhibitions of cancer and to suggest the trophoblast elements . . . as the constant malignant component."

(That gonadotrophic hormones are to be found in the urine of many cancer patients has been known since the early days of Zondek's investigations upon "prolan." The significance of this observation was soon discounted by recognition of the fact that such patients are usually postmenopausal, and that gonadotrophes are normally found in considerable amount after the menopause. But the studies of Krebs and Gurchot appear much more provocative, in that they find in cancer patients a gonadotrophin which, as they say, is duplicated only by that produced by the trophoblast.

Many authors have called attention to the fact that trophoblastic tissue possesses many of the attributes of cancer. It destroys and invades uterine tissue, it penetrates blood vessels and, in the form of the normal deportation of villi and trophoblast, exhibits a physiological form of metastasis. The restriction of these destructive features of normal implantation makes it necessary to assume some defensive mechanism on the part of the maternal organism, and such a mechanism must exist.

It is of interest to note that a method of cancer cure which was widely employed not a great many years ago, even in many of our best clinics, was based upon this very similarity of trophoblastic tissue to cancer growth. I refer to the colloidal lead therapy introduced at that time by no less a personage than the late Sir Blair Bell, one of the leading gynecologists of the world. Since certain metallic substances, such as colloidal lead, had been shown to inhibit the growth of trophoblast, he reasoned that they might also retard the growth of cancer tissue. The method enjoyed considerable vogue for a number of years, but was then abandoned as ineffective, and I mention it only because it appears to bear upon the problem discussed in the above abstract.—Ed.)

## MYXOSARCOMA OF THE BROAD LIGAMENT

E. FRIEDMAN

Proc. Roy. Soc. Med., 39: 581, 1946

A 35 year old patient had noticed abdominal enlargement 3 months previously and complained of some frequency and pain in the left thigh on lying down. She also had a dry cough. An immobile mass, the size of a baby's head, was felt rising out of the pelvis. The cervix was pushed high in the right fornix by a

as biopsy or curettage, but rather complements them; (6) may reveal cancer where biopsy has failed; (7) is of value in following up results of therapy.

The main disadvantages of the test are: (1) criteria need to be more clearly outlined and standardized; (2) type and origin of malignant cells are not always clear; (3) does not show grade of malignancy; (4) does not give information as to mitotic activity or relationship of growth to adjoining tissues; (5) time required for smear examination is somewhat longer than that required for pathologic section. 5 figures.

(The author of this paper may be considered the father of the smear method of study of vaginal cytology, and his technique has been widely employed in the study of the reproductive cycle in humans. With Traut he published an important monograph in 1943, calling attention to the value of vaginal smear studies in the diagnosis of uterine cancer, and this likewise has created great interest. That cancer is an exfoliative disease and that it can be diagnosed from individual cells or clumps of cells in the vaginal exudate permits of no doubt, though there are differences of opinion as to the practical value of the method, especially as contrasted with biopsy. The general feeling at the moment, even among enthusiasts for this method, is that for decisive diagnosis we must still rely chiefly on biopsy, but that the vaginal smear technique may sometime prove to be of great value as a screening method in the examination of large numbers of women.

In the present paper the author extends the application of a similar technique to the examination of various body fluids, and reports encouraging preliminary results. He is very conservative in his viewpoints as to the value and limitations of the method, and no fault can be found with the very fair balance sheet of advantages and disadvantages which he sets forth.

The proper application of the method is time-consuming and presupposes some degree of expertness in vaginal cytology. It would seem to be a good plan for gynecologic clinics with a sufficient personnel to interest one of the staff, probably a junior member, in perfecting himself in the technique, thus contributing to the final evaluation of this diagnostic method.—Ed.)

## TROPHOBLAST ELEMENTS IN CANCER

E. T. KREBS, JR. AND C. GURCHOT

Science, 104: 302, 1946

In confirmation of Roffo's findings that, when injected into immature female rats, an extract of the blood or urine of cancer patients causes uterine enlargement and formation of corpora lutea, the authors have obtained from cancer patients of both sexes, by urinary extraction, preparations having pronounced estrogenic as well as gonadotrophic properties. It is their conclusion that the estrogenic factor (termed "steroid E" by Roffo) arising from the definitive malignant elements is identical with the steroids produced by the syncytial trophoblast of pregnancy.

Employing the technics of chromatographic adsorption and the African clawed toad, *Xenopus laevis*, as a specific indicator of chorionic prolactin, the authors have obtained egg extrusion in *Xenopus laevis* by the injection of 1 cc. of the concen-



life. Saline or sodium bicarbonate douches may be helpful. During pregnancy the discharge should not be treated unnecessarily by douches, but the parts may be sponged with bicarbonate solution and thoroughly dried.

In cases of local cervical lesions, if simple astringent douches do not give relief, then cauterization of the cervix in a linear radiate manner is the best treatment. If the cervix is badly lacerated, amputation will usually have to be performed.

(I doubt whether many gynecologists will go along with Bowes in limiting the application of the term "leucorrhea" to vaginal discharges which are white, just because the term etymologically means a white discharge. Certainly most of us will probably still continue to speak of a yellowish leucorrhea, or a watery one, or of the greenish leucorrhea which is so commonly seen with trichomonas infection. Such purist etymological considerations can scarcely dislodge the long-entrenched application, or misapplication, of medical designations of this sort, and the way of the reformer in this field is apt to be long and wellnigh hopeless. The last sentence of the abstract, to the effect that badly lacerated cervixes usually require amputation, can scarcely be accepted without qualification. Certainly amputation is always to be looked upon as undesirable in patients of the childbearing age. The laceration itself is relatively innocuous unless associated with pronounced cervicitis, as it often is, but such cases are ordinarily amenable to less radical procedures than amputation, such as cauterization, conization or tracheloplasty.—Ed.)

## TREATMENT OF PELVIC CONDITIONS IN WOMEN; USE OF A NEW DEVICE IN PHYSICAL THERAPY

A. F. LANDEKER

M. Rec., 159: 341-343, 1946

The author describes several pelvic conditions in women, including inflammation of the parametrium and the adnexa, pelvic neuralgia with spasms of the urinary bladder, hyperfunction and dysfunction of the ovaries with retarded and atypical menstrual periods and dysmenorrhea, to which he has applied a new device of physical medicine, by using a specific applicator tube mostly containing helium and neon or helium, neon and proactenium. The significance of these treatments can be easily demonstrated by blood counts and biochemical tests which show an increase in hemoglobin and sometimes, according to a favorable reaction, an increase in lymphocytes, and in several cases, improvement of the calcium content of the blood and of the calcium-phosphorus relationship.

It seems likely that the electropotential of the cells can be changed by the bombardment of the tissues involved with certain ions of certain minerals which are constantly undergoing a bombardment by certain gases, within the applicator tube (cataphoresis?). Similarly, the addition of certain substances, such as eosine and others, seems to sensitize the skin and the mucous membranes, for the effect of certain rays.

Four case reports are presented which illustrate the effectiveness of this treatment. The first patient suffered from inflammation of the adnexa and para-

mass in the left fornix, which appeared to be part of the abdominal tumor. A provisional diagnosis of intraligamentous fibroids was made. At operation a mass was found lying in the left broad ligament, immobile and firmly fixed to the bladder, colon and rectum. Uterus, ovaries and both tubes appeared normal. Any attempt to remove the tumor would have seriously endangered the patient's life. Microscopically it was a malignant tumor showing considerable myxomatous degeneration; it was of primitive fibre-forming connective tissue cells.

Although sarcoma can occur in almost any part of the body, those of the broad ligament represent the smallest group. Histologically they derive from an undifferentiated embryonic tissue which is believed to begin to grow under the stimulus of an impulse such as puberty, trauma or the menopause. The author suggests that deep x-ray therapy might be worth a trial, especially in early cases, but the prognosis is poor, even when the tumor has been entirely removed.

(Tumors arising in the broad ligaments are rare, but they may arise from any of the histological elements found between the layers of the ligament—connective tissue, muscle, blood and lymph vessels, or vestigial embryologic structures. I have recently examined sections of what is evidently a large lymphangiomatous tumor arising in the broad ligament, quite separate from either uterus or ovaries.—Ed.)

## LEUCORRHOEA

K. BOWES

Practitioner, 157: 147-148, 1946

The name leucorrhea implies a white discharge, therefore excluding purulent discharges such as those due to *Trichomonas vaginalis* or *Monilia albicans*. The normal vaginal fluid has an acid reaction (pH 4-5). Microscopically the contents consist of desquamated squames from the vaginal wall, numbers of leucocytes and, during adult life, quantities of the *Bacillus vaginalis* (Doderlein's bacillus). The amount of secretion varies with the patient's general health, and increase in the discharge caused by pregnancy or by excessive secretion by the cervical glands may be considered as of physiological origin. Before puberty and after the menopause, when the vaginal fluid has an almost neutral reaction, infections are more likely to occur, giving rise to a purulent discharge. During adult life, leucorrhea may arise pathologically from increase in cervical secretions due to infection or congestion by retroversion or fibroids.

Investigation of a case of leucorrhea requires consideration of the history in respect to the patient's age, parity and past infection, local examination to note the type of discharge and to ascertain the state of the vagina and cervix, and pathological examination to determine whether pus is present, the pH, and the presence of normal or abnormal vaginal flora.

In cases of simple physiological leucorrhea, treatment depends on general measures, such as correction of anemia and constipation and a generally healthy

Any physician who understands the psychological processes of present-day psychopathology can master the technique of hypnoanalysis. The time required to cure frigidity in the present series of cases varied from 8 to 60 hours.

A current review of the accepted factors responsible for this symptom complex is presented.

(A number of papers have recently appeared which have been written by psychiatrists upon various gynecological problems. I have waded through them all, but I confess that when I have finished I have felt as if I had been shoveling smoke. Kroger's paper left me in somewhat the same unhappy state, probably because I am not properly attuned to the ethereal vibrations of thought of the highly trained psychiatrist, and am unfamiliar with all the new-fangled concepts of modern psychiatry.

The only two of Kroger's 12 conclusions into which I felt that I could sink my teeth, and with which I believe that we poor benighted gynecologists will all agree are first, that "true frigidity is a common problem in gynecology", and, second, that "it is often an illness of the unconscious", meaning, I suppose, that it is of psychogenic origin.

These flippant remarks do not mean that I in any way underrate the importance of proper psychiatric examination and management of many cases of sexual frigidity, as of certain other gynecological problems, such as certain real or pseudo-menopausal disturbances, primary dysmenorrhea, etc. I am firmly convinced of just the opposite viewpoint, although I do believe that, except in the more severe cases, a gynecologist with a fair amount of common sense is justified in applying his own amateur brand of psychotherapy without resort to the services of the expert psychiatrist.

What I really mean by this slap-stick comment is that I wish that psychiatrists, in writing papers for the consumption and edification of the common man, would as a group try to develop the faculty of coming down from the skies with their expositions, to the level of understanding of said common man.—Ed.)

metrium, with attachments of the intestines to the female organs. She had suffered most excruciating pain and scanty, delayed menstrual periods. Her pains were intensified after an operation resulting in the removal of the numerous attachments to the pelvic organs. After 2 vaginal treatments of 5 and 7 minutes each, she had a practically painless menstrual period on time. The second patient had pelvic neuralgia with particular involvement of the urethra and bladder. After a few treatments consisting of vaginal application of the neon rays directed toward the urethra, all symptoms disappeared. The third patient suffered from dysmenorrhea and irregular menstrual periods. After 2 vaginal treatments her menstrual period occurred in 30 days and without pain. The last patient whose case is presented had a very painful induration of the right and left parametrium in the rectovaginal space of about 2 inches wide and 4 inches long. Her symptoms included extremely painful bowel movements, a painful urgency to urinate, and difficulty in walking, sitting and sleeping. After 6 treatments, applied by the vaginal and rectal routes, the painful masses had practically disappeared. After 8 treatments, the patient showed no masses and was, subjectively and objectively, completely cured.

(The "scientific" basis for the employment of such a device seems to me very flimsy indeed. Without meaning to sound oracular, it is my impression that this is just another of "those things"; I feel no urge whatever to try it.—Ed.)

## THE TREATMENT OF PSYCHOGYNETIC DISORDERS BY HYPNOANALYSIS

W. S. KROGER

*Am. J. Obst. & Gynec.*, 52: 409-418, 1946

It is concluded by the writer that the vast majority of patients, especially in functional gynecologic disorders, are likely to present some psychological cause for their physiologically expressed disturbances. The present paper deals particularly with the symptom complex of frigidity.

True frigidity is an illness of the unconscious; a neurosis. Other gynecologic "symptom equivalents" mask this "organ neurosis". In this common gynecologic disorder it is believed that hypnoanalysis is a rapid and rational form of therapy. Nine out of 12 cases of true frigidity, after a wide variety of symptomatic treatment, were permanently relieved by this method. Hypnoanalysis utilizes many of the concepts of the Freudian theory, i.e., interpretation of the transference, free association, piece-meal disintegration of the patient's resistances, reintegration into consciousness of the repressed material, and the redistribution of the psychological energies formerly exploited by the symptom complex of frigidity. Thus the patient gains insight into factors responsible for the symptom complex.

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compared with normal pregnant women—to present a decrease both in serum albumin and serum globulin.

It appears that the hemocrit value is the same in toxemic patients without eclampsia as in normal pregnant women, whereas the amount of total protein is decreased. This reduction is due exclusively to a decrease in the amount of serum albumin, probably owing to a loss of albumin through the kidneys.

As regards the eclamptic patients, the writers' results do not accord with those of previous authors. In the present study there was found a decrease in serum globulin and a corresponding increase in serum albumin, whereas others generally found an increase in serum globulin. One possible explanation for the decrease in serum globulin is that globulin may be lost through the kidneys or the endothelium of the capillaries. If this should be the case, however, the simultaneous loss of albumin should be far greater than it actually is. The authors believe that a more likely explanation is that, if eclampsia is present, the power of the organism of producing serum globulin has somehow been diminished. While most investigators are inclined to think that the reduced amount of globulin is due to an impaired liver function, the authors believe that attention should also be directed to the adrenal cortex, which probably plays a greater part in toxemia of pregnancy and eclampsia than is generally supposed.

(This article is a thoughtful and painstaking evaluation of the serum proteins in the toxemias of pregnancy but like previous papers on the same topic its net yield is rather meager, whether judged from the viewpoint of the etiology or the clinical management of the toxemias. It once fell my lot to spend almost a whole year doing little else than estimations of serum proteins in normal and toxemic gravidæ, and as the result of this experience two indelible impressions have remained:

1. The A/G ratio affords no help in the toxemias of pregnancy for a number of reasons: (a) The albumin/globulin ratio of any given serum will vary widely with the minutiae of laboratory technic employed, especially with the type of filter paper used, the number of times the albumin solution is filtered and with the degree to which the albumin solution is diluted. This has been brought out very forcibly by Robinson, Price and Hogden,—*Jour. Biol. Chem.*, **120**, 481, 1937. (b) The A/G ratios reported for the various toxemias are close enough together so that any differences can easily be accounted for either by sampling error or by the above laboratory source of discrepancy. This suggests that the relationship between these two serum proteins remains fairly constant in normal and in toxemic pregnancy. (c) The main factor which avowedly may cause an inverted ratio, as in nephrosis, namely prolonged and massive albuminuria, is rarely seen in the toxemias. The proteinuria, if prolonged, is usually minimal; and if massive, it is usually short-lived and in addition contains so much globulin that the serum A/G ratio is not appreciably affected. (d) In the several hundred A/G ratios done in this Clinic over the past twenty years I have never seen a figure below 1.2 and know of no instance in which the A/G ratio afforded the slightest clinical help. We no longer do them, except in cases of suspected nephrosis.

2. The total serum protein figure (much easier for the laboratory to do, incidentally) rarely affords help in the toxemias but may be significant in relation to edema provided it is below 5.0 grams per 100 cc. As all of us know, however, such low figures are rarely found either in eclampsia or pre-eclampsia and certainly hypoproteinemia is not the cause of the edema in those conditions. Occasionally, however, cases of edema in pregnancy are encountered, in which the total serum proteins have fallen below 5.0 grams per 100 cc. as the result of nutritional deficiencies, and in these the hypoproteinemia may be one of the causative factors in the edema.—Ed.)

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# *Obstetrics*

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## PHYSIOLOGY OF PREGNANCY, LABOR AND PUERPERIUM

### INVESTIGATION OF THE SERUM PROTEIN BALANCE IN NORMAL AND TOXAEMIC PREGNANT WOMEN

E. MØLLER-CHRISTENSEN AND J. E. THYGESEN

J. Obst. & Gynaec. Brit. Emp., 53: 328-344, 1946

Serum protein determinations have been made in normal non-pregnant women, in normal pregnant women and in toxemic pregnant women by a method of analysis developed by the authors.

Group I comprised 20 normal non-pregnant women between the ages of 24 and 35. The average value of total protein was 7.16 per cent; serum albumin, 4.67 per cent; serum globulin, 2.49 per cent; albumin/globulin quotient, 1.94.

Group II comprised 20 normal pregnant women in the last 2 months of pregnancy. These women presented normal urine, the systolic blood pressure did not exceed 125 mm. Hg. and there was no edema. The average values were: total protein, 6.18 per cent; serum albumin, 3.75 per cent; serum globulin, 2.43 per cent; albumin/globulin quotient, 1.54.

A comparison between the average values of normal non-pregnant women and normal pregnant women reveals a fall in the amount of albumin from 66 per cent in non-pregnant women to 61 per cent in pregnant women, and a rise in serum globulin from 34 per cent in the former to 39 per cent in the latter.

Group III comprised 24 toxemic pregnant women who were subdivided into 8 cases with mild toxemia without eclampsia, 11 cases with severe toxemia without eclampsia, and 5 cases of toxemia with eclampsia. The average values in the group with mild toxemia only were: total protein, 5.95 per cent; serum albumin, 3.26 per cent; serum globulin, 2.69 per cent; albumin/globulin quotient, 1.21. For the group with severe toxemia the average values were: total protein, 5.40 per cent; serum albumin, 2.91 per cent; serum globulin, 2.49 per cent; albumin/globulin quotient, 1.17. In patients suffering from toxemia with eclampsia the average values were: total protein, 5.56 per cent; serum albumin, 3.27 per cent; serum globulin, 2.29 per cent; albumin/globulin quotient, 1.43.

The amount of total serum protein proved to be reduced to an equal extent in the toxemic patients presenting eclampsia and in those not presenting eclampsia. However, this reduction was due exclusively to a decrease in the amount of serum albumin in non-eclamptic patients, while the eclamptic patients were found—

## THE ONSET OF OVULATION DURING THE PUERPERIUM

R. A. LYON AND M. J. STAMM

California Med., 65: 99-103, 1946

Fifty unselected puerperal women, aged 18 to 37, mostly primiparae, were followed by means of the basal body temperature method for resumption of the normal ovarian cycle. They were studied until 6 months postpartum. Rectal temperatures were taken at approximately the same time each day and endometrial biopsies were taken in some cases for correlation during the phase of elevated temperatures when a functional corpus luteum was to be expected.

In general, basal body temperatures were lower during the puerperium and showed more fluctuation than in the regularly ovulating cyclic woman. The patients were divided according to the duration of lactation. For those not lactating (24) the average onset of catamenia was 7.7 weeks postpartum; for those lactating a month (17) catamenia was 7.9 weeks postpartum; and for those lactating 1-3 months (9) catamenia was 11 weeks postpartum, showing that the average onset of menstruation is delayed following delivery in proportion to the length of the lactation period. However, the interval of lactation to the first menstruation decreased progressively as duration of lactating increased.

The initial ovulation following delivery in those not lactating occurred at an average of 10.2 weeks; 10.6 weeks when lactation occurred for 4 weeks and 17 weeks after 3 months' lactation. However, the lactation to ovulation interval decreased markedly with increased duration of lactation, the interval mean becoming zero at 8 months postpartum.

The endometrial biopsy specimens showed striking large spindle-like cells, abundant loose reticulum hypovascularity, and distended uterine glands growing close together. When ovulation occurred the progestational effects seemed incomplete and quantitatively small. The frequent prolongation of menstruation is associated with either this hyperplasia of proliferative endometria or incomplete progestation.

The nonlactating puerperal cycle had a tendency to be prolonged. When ovulation first occurred it tended to appear late in the cycle, the progestational phase being shortened with a tendency toward menorrhagia. Subsequent cycles became more normal. Anovulatory menstruation, occurring in about 95 per cent of the nonlactating group, tended to be more prolonged than after ovulation appeared. When menstruation occurred early during the puerperium, the cycle tended to be prolonged and irregular. After ovulation occurred the cycles were normal.

THE VALUE OF PLASMA PITOCINASE DETERMINATIONS  
IN OBSTETRICS

E. W. PAGE

Am. J. Obst. &amp; Gynec., 52: 1014-1022, 1946

Very early in pregnancy, an enzyme capable of inactivating pitocin appears in the blood. This protein is referred to at present as "pitocinase". In 1941 Werle and his co-workers studied the inactivating power of pregnancy blood on pitocin and pitressin. They demonstrated the enzyme in the second month of pregnancy. They could detect none in the serum of non-pregnant women nor in fetal cord blood, but found traces of activity in all urine specimens and in colostrum.

A technique for determining the plasma concentration of pitocinase is described, and the properties, kinetics, stability and distribution of pitocinase are discussed.

From the 14th to the 38th week after conception there is a thousandfold increase in the plasma pitocinase concentration, and this high level is maintained during labor. Following delivery the enzyme decreases logarithmically at the rate of about 25 per cent per day until it disappears in 4 weeks. From plasma pitocinase determinations the existence and also the week of pregnancy may be closely approximated. Of prognostic value, perhaps, would be the knowledge of whether the pitocinase level is increasing or decreasing after a bleeding episode in the first trimester, since there occurs the same logarithmic decline of pitocinase concentration after abortion as after delivery.

Of 16 cases of pre-eclampsia and eclampsia studied to date, only 3 had plasma pitocinase levels which fell within the normal range. Seven had abnormally high values and 6 had abnormally low values. In 2 cases of pregnancy complicated by severe arteriolar hypertension, normal values were observed. Ahlmark has found that in pre-eclampsia and eclampsia, plasma histaminase values are likewise scattered on both sides of the normal range. The present observations, together with those of Ahlmark on histaminase and Smith and Smith on serum fibrinolysin, suggest that there is a basic enzymatic disturbance associated with eclampsia. 3 figures.

(This is a unique and arresting observation with far-reaching and fascinating implications. Further work on plasma pitocinase will be awaited with great interest.—Ed.)

iologically active during the embryonic and fetal periods; they demonstrate not only the early functional activity of the gland but also suggest an independently regulated mineral metabolism within the organism.

## FURTHER OBSERVATIONS ON CAPILLARY FILTRATION RATES IN PREGNANCY

C. E. McLENNAN

Am. J. Obst. & Gynec., 52: 837-839, 1946

Normally pregnant women permit the filtration of fluid from minute blood vessels into tissues (forearm) at a more rapid rate than do nonpregnant women or pregnant women with some form of toxemia of pregnancy. This was first demonstrated in 1943 by measuring the rate of filtration of fluid through the capillary wall by means of the pressure plethysmograph. The present paper confirms the previous work by adding 24 additional observations. Eight of these were normal controls, 11 were normally pregnant near term and 5 were pregnant with symptoms of pre-eclampsia.

Although no satisfactory explanation is offered for the increased rate of capillary filtration, the obvious inference is that the permeability of the capillary wall is increased in the pregnant woman. In the patients with toxemia of pregnancy who do not exhibit this increase in filtration rate the explanation lies in the fact that they have sufficient edema to interfere with further filtration of fluids into the tissues.

## ELECTRICAL POTENTIALS OF THE HUMAN UTERUS IN LABOR

L. V. DILL AND R. M. MAIDEN

Am. J. Obst. & Gynec., 52: 735-745, 1946

The electro-investigation of smooth muscle containing organs has been slow and difficult because the structures are relatively inaccessible, small voltages are emitted and the interpretation of the findings is exceedingly difficult.

The electrical activity of the uterus had previously been determined by the string galvanometer of Eimthoven. In this work both alternating and direct current amplifiers and recorders were used. The first alternating current amplifier and recorder used was the portable electrocardiograph; the other was the portable electroencephalograph. A special direct current amplifier and super-

## OVULATION IN NON-LACTATING PUERPERA

ROBERT A. LYON

Proc. Soc. Exp. Biol. &amp; Med., 63: 105-106, 1946

The time of reappearance of ovulation in nonlactating puerperas was studied in 23 patients; basal temperatures were charted until ovulation and menstruation occurred regularly. In 7 of the group endometrial biopsies were obtained during temperature elevation and progestational or secretory changes were observed in each instance. Menstruation recurred within two weeks after biopsy. The average time of reappearance of menstruation in this series of 23 patients was 8.4 weeks, which is almost in agreement with the results obtained by Griffith and McBride (*J. Michigan M. Soc.*, 38: 1064, 1939). In their series of 11 patients, the average was 8.0. The average time of postpartum ovulation, however, was considerably later; that of the author was 10.2 weeks and of Griffith and McBride, 20.0. In a few of Lyon's patients, ovulation occurred prior to menstruation, thus lowering the average time of recurrence. Although anovular bleeding occurred prior to ovulation when lactation was not carried on or ended early, it was observed that after the eighth postpartum week ovulation preceded menstruation with increasing frequency. The variation in the appearance of ovulation in the absence of lactation may be caused by different degrees of gonadotropic stimulation, being sufficient in some cases to cause ovulation even in the sixth postpartum week.

ANATOMICAL EVIDENCE OF PRENATAL FUNCTION OF  
THE HUMAN PARATHYROID GLANDS

EDGAR H. NORRIS

*Anat. Rec.*, 96: 129-41, 1946

While the structure of the body is being differentiated during gestation, functional adaptations are directed toward the establishment of the individual's complete physiologic independence. An earlier study made by the author of 447 human parathyroid glands in 139 embryos, fetuses and newborns, throughout the gestational period, led to a study of the early functionability of the parathyroid glands.

During the fifth week of gestation parathyroid tissue is first recognized in the walls of the third and fourth endodermal gill pouches. From the time of their first appearance, the cells of the parathyroids are morphologically the same as one of the cytological elements found in the parathyroids of postnatal life, and are easily recognizable in the earliest stages of development of the gland.

These findings support the theory that the human parathyroid gland is phys-

# MANAGEMENT OF NORMAL PREGNANCY, LABOR AND PUERPERIUM

## A STATISTICAL STUDY OF DELIVERY WITH CONTINUOUS CAUDAL ANALGESIA, AS COMPARED WITH OTHER METHODS

S. D. COLLINS, F. R. PHILLIPS, D. S. OLIVER

With collaboration of R. A. HINGSON,  
N. VAUX, and C. B. LULL

Public Health Reports, 61: No. 48, 1946

If the method of continuous caudal analgesia could be applied to all deliveries in the United States with the same results as in the Philadelphia Lying-In Hospital, the present estimated loss of about 125,000 viable infants through still-birth and death within the first week of life could be cut in half.

The report which permits this conclusion is a detailed statistical analysis of the deliveries of 2516 mothers under continuous caudal analgesia at the Philadelphia Lying-In Unit of the Pennsylvania Hospital during the period of May, 1943 through August, 1945. The deliveries of 1024 mothers with the usual anesthetics and sedatives during the time from December, 1942 to July, 1943 at the same hospital provided a comparable control group. Data about mothers in the two groups indicate that they were comparable in age, parity, state of health, and many other factors that might influence the outcome of childbirth.

Metycaine was the drug used for the continuous caudal analgesia group. 90.4 per cent received complete relief from pain, 4.3 per cent partial relief, and 5.3 per cent were failures. There was a slightly lower percentage receiving complete relief among those over 35 years of age (Fig. 1).

The average duration of caudal analgesia was 3.7 hours for primiparas and 2.3 hours for multiparas with a median of 2.2 hours for the whole group.

About one-third of all mothers showed a marked drop in systolic blood pressure. The percentage of mothers whose blood pressure dropped 25 or more millimeters was slightly higher for those over 30 and under 18 years of age. Of patients of all ages 48.5 per cent showed a drop of 1 to 20 mm. Of mothers with precaudal systolic blood pressures of less than 105 mm. the drop was less than 5 mm. in 45 to 80 per cent. But of those with precaudal systolic pressures of 135 mm. or more, 40 to 65 per cent experienced drops of 35 to 70 mm. (Fig. 2).

The average blood loss for all mothers in the caudal group was 127 cc. with 8.6 per cent losing more than 250 cc.

The average duration of labor in the caudal group was 11.1 hours, as compared with 11.3 hours in the control group. The controls had more mothers with very long labors and more with very short labors.

In the caudal group 84.5 per cent were operative deliveries compared to 69 per cent in the controls. The difference is accounted for by fewer spontaneous and more outlet forceps in the caudal group. The incidence of midforceps is 8.4 per cent in the caudal group and only 4 per cent in the controls (Fig. 3).

sensitive recorder was employed to determine uterine electrical activity of less than one cycle per second. A total of 18 patients were used for uterine tracings.

Under the conditions of this experiment the contraction of the uterine muscle during labor in the human is accompanied by changes in potential of low frequency and voltage.

Voluntary muscular activity, the apparent lack of identical or even similar conduction patterns, and the technical inherent difficulties of the amplification of direct current all make a great deal of investigation necessary before the procedure can be properly evaluated in respect to its status in the labor problem.



The duration of the third stage was significantly shortened. Severe afterpains were less frequent in the caudal group. This may be accounted for by the routine administration of 12 to 16 mgm. of morphine within one hour after delivery (Fig. 4).

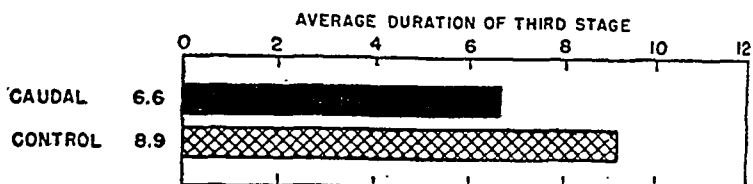


FIG. 4. Average duration in minutes of the third stage of labor for the caudal and control groups. (Collins, etc.)

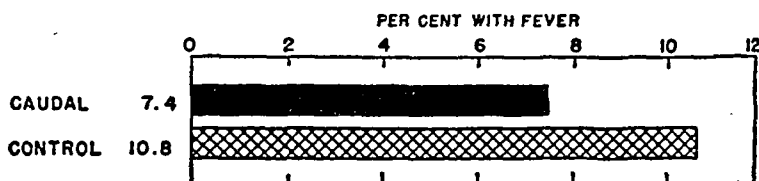


FIG. 5. Percentage of mothers who had a postpartum temperature of 100.4°F. for two or more consecutive days in the caudal and control groups. (Collins, etc.)

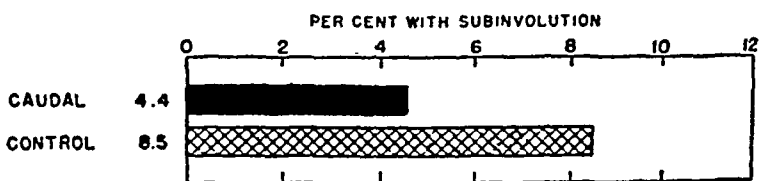


FIG. 6. Percentage of mothers found to have subinvolution of the uterus on examination 6 weeks after delivery in the caudal and control groups. (Collins, etc.)

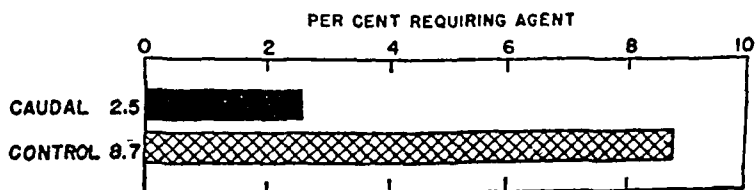


FIG. 7. Percentage of infants who required a special agent to induce respiration in the caudal and control groups. (Collins, etc.)

The incidence of caudal postpartum catheterizations was 16.7 per cent as compared with 14.1 per cent in the controls. Febrile puerperium and subinvolution was definitely and significantly reduced in the caudal group (Figs. 5 & 6). There were two maternal deaths in each group but no details of them were presented.

Of considerable interest in this study are the fetal morbidity and mortality

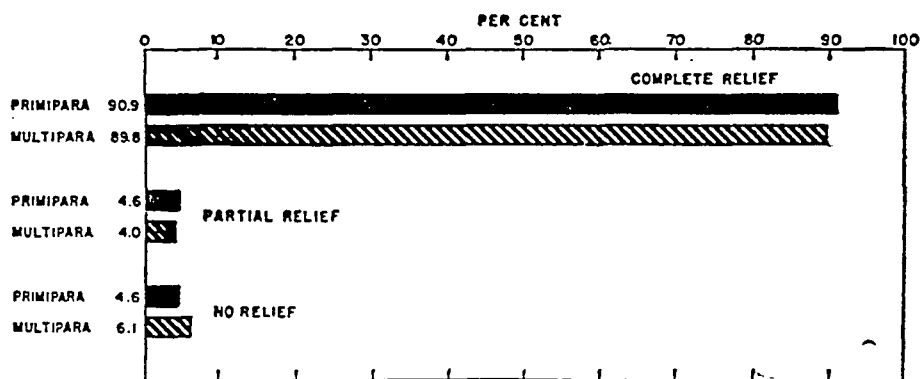


Fig. 1. Percentage of mothers with relief from pain during delivery with continuous caudal analgesia by parity. (Collins, etc.)

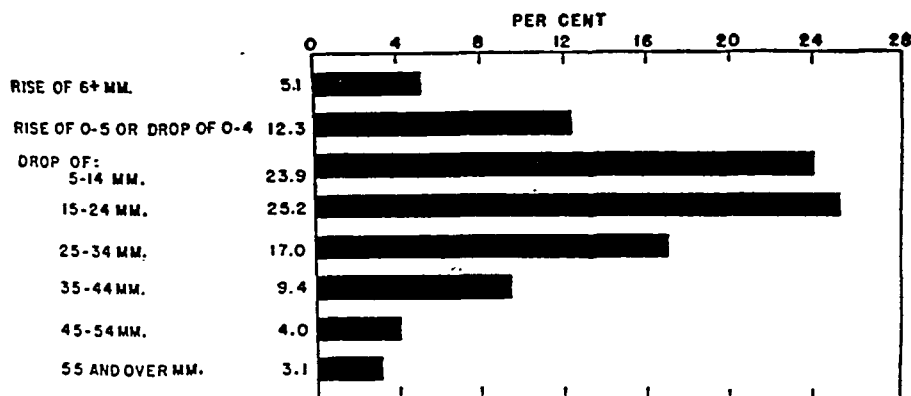


Fig. 2. Percentage distribution of mothers according to drop in systolic blood pressure (in millimeters of mercury) during continuous caudal analgesia. (Collins, etc.)

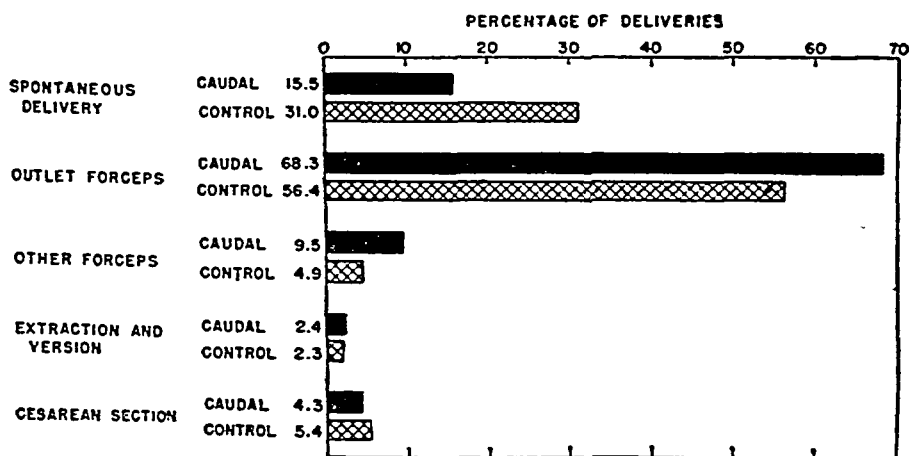


Fig. 3. Percentage distribution of infants according to type of delivery of the mothers in the caudal and control groups. (Collins, etc.)

figures. Among the infants delivered by continuous caudal those who had difficulty breathing amounted to 3.6 per cent of the total as compared with 9.6 per cent of the control group. In the caudal group 2.5 per cent of the infants required the use of a special agent to induce respiration as compared with 8.7 in the control group (Fig. 7).

Although the per cent net gain in weight by the seventh day was not significantly greater in the caudal cases, it did show some increase (Fig. 8).

In the caudal group the stillbirths amounted to 9.1 per 1000 live births, as compared with 24.8 per 1000 in the control group. The neonatal deaths (those within the first week) were 11.5 per 1000 live births in the caudal group as compared with 20.8 per 1000 in the controls (Figs. 9 & 10). The latter figure is about the same as that for the country as a whole—22.3, 20.8 and 19.9 per 1000 live births for the years 1941, 1942 and 1943 respectively.

The total loss of infants amounted to 20.6 per 1000 live births in the caudal group and 45.6 per 1000 in the control group, a significant difference.

Although favorable figures were presented showing a reduction in neonatal mortality for premature infants the small size of this group would not permit the difference to be statistically significant.

## DEMEROL ANALGESIA IN OBSTETRICS

ALEXIS MAXIMOV

California Med., 65: 43-47, 1946

This is a review of 300 deliveries at Sonoma County Hospital conducted under demerol and scopolamine analgesia compared with a control group of 300 deliveries conducted under barbiturates, paraldehyde and scopolamine.

In the study group the patient was given 100 mgm. of demerol and 0.48 mgm. (1/150 gr.) scopolamine intramuscularly when active labor began; this combination was repeated in 3 hours and demerol 100 mgm. alone, was given at 3 hour intervals thereafter. 250 required only 1 dose of demerol; 40 required but 2 doses. 86 per cent of the study group obtained satisfactory analgesia in contrast to 48 per cent satisfactory analgesia in the control group. Labor was shortened by 4.2 hours in primiparae and 2.2 hours in multiparae in the series using demerol in comparison with the control group. No untoward effects were observed in the use of demerol by the intramuscular route. 95.4 per cent of the infants under demerol analgesia breathed spontaneously within 2 minutes, and in only 2 infants in the series was there a possibility that analgesia played a part in resuscitation difficulties. Among the 24 premature babies, demerol had no deleterious effect. Fourteen cesarean sections were premedicated with demerol and scopolamine with no resultant deleterious effects on the infants.

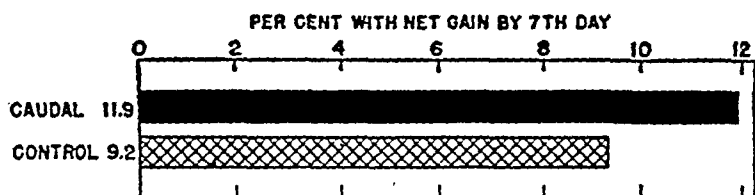


FIG. 8. Percentage of infants who made a net gain in weight by the seventh day of life in the caudal and control groups. (Collins, etc.)

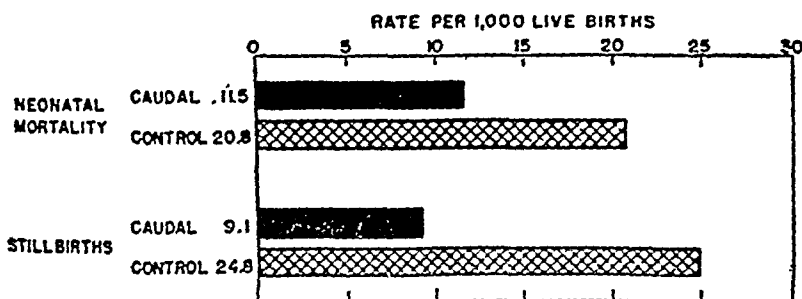


FIG. 9. Stillbirths and neonatal mortality per 1,000 live births in the caudal and control groups. (Collins, etc.)

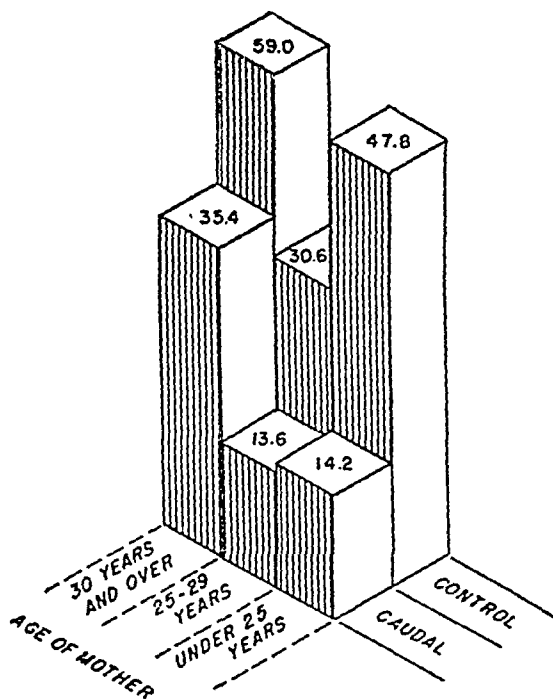


FIG. 10. Stillbirths and neonatal mortality per 1,000 live births among mothers of different ages in the caudal and control groups. (Collins, etc.)

One patient, with first stage lobar pneumonia in both lungs, died four hours after the second administration of the drugs; a stillborn fetus was delivered. Of the 171 babies delivered of 170 women, 157 (92.4 per cent) breathed spontaneously immediately; 13 (0.6 per cent) were born apneic and the Torpin insufflator was employed, with 12 resuscitated. One infant weighing 4 pounds nine ounces died ten minutes after endotracheal insufflation of air. The authors believe that if these drugs are not given too early in labor and only in amnesic dosages, labor is usually not delayed and spontaneous delivery occurs. Safety and success of this method is dependent upon the experience and ability of the person employing it.

Moffitt said, in discussion of the paper, that in controlling the excitable patient, meperidine hydrochloride (Demerol) was preferable to morphine sulfate, with less depressing effect on the infant's respiration.

## A NUTRITIONAL SURVEY AMONG PREGNANT WOMEN

J. YOUNG, E. J. KING, ELIZABETH WOOD AND I. D. P. WOORTON

J. Obst. & Gynaec. Brit. Emp., 53: 251-259, 1946

The present investigation was undertaken to determine if any evidence of malnourishment could be detected in a random series of pregnant women attending the antenatal department of the authors' hospital. This report is concerned with the findings in respect to hemoglobin, vitamin C and plasma phosphatase in this series of patients. The determination of alkaline phosphatase activity of the plasma was considered the best means of investigating the possibility of abnormality in calcium-phosphorus metabolism, arising either through lack of the minerals or of vitamin D.

It was found that the mean hemoglobin fell from 12.3 g. (82.8 per cent) in early pregnancy to 11.6 g. (78.6 per cent) in late pregnancy. In the puerperium the hemoglobin had almost regained its former value, and at 6 to 12 months post partum, a still higher value (88.6 per cent) was reached.

The mean value of ascorbic acid was 0.59 in early pregnancy, 0.57 in late pregnancy, 0.49 in the puerperium and 0.80 at 6 to 12 months post partum. The possibility that this fall is caused by minor degrees of deficiency cannot be discounted; it is supported by the findings of Craig *et al.* who observed a wide variation in results of saturation tests done on pregnant women.

The mean plasma phosphatase values were 4.3 in early pregnancy, 10.5 in late pregnancy, 10.4 in the puerperium and 7.6 at 6 to 12 months post partum. This rise during pregnancy from 4.3 units (normal for non-pregnant women) to about 10 units is paralleled by previously published findings. Ramsay *et al.* found significantly higher phosphatase values in "ill" patients than in "well", and suggest that there is evidence of unsatisfactory calcium and phosphorus metabolism among the "ill" patients.

## AMNESIA DURING PARTURITION

## USE OF PENTOBARBITAL SODIUM AND SCOPOLAMINE HYDROBROMIDE

PERRY P. VOLPITTO

J. A. M. A., 132: 1059-62, 1946

Over 1,000 women in labor were delivered during a four year period after receiving intravenously a combination of pentobarbital sodium and scopolamine hydrobromide. The object was to produce amnesia, not analgesia or anesthesia. The contents of an ampule of pentobarbital sodium (0.25 gm. or  $3\frac{1}{2}$  gr.) and an ampule of scopolamine hydrobromide (0.00064 gm. or  $\frac{1}{156}$  gr.) were mixed and diluted to a 10 cc. capacity with sterile distilled water, and administered intravenously, using a 10 cc. syringe with a small, 27 to 22 gage needle. At first 3 or 4 cc. of the mixture is given rather rapidly, 1 cc. every five to ten seconds; then more slowly at the rate of 1 cc. every thirty seconds until the patient is asleep or talking incoherently. Injection is then stopped but the needle retained in place. If the patient is restless during uterine contraction, an additional 1 to 3 cc. is administered. No further injection is given if the patient is slightly restless, opens her eyes or talks incoherently. The dosage will range from 6 cc. to 20 cc.; the average amount is 10 cc. Three-quarters to one hour after the initial injection the average patient will become restless during a pain and a further injection of not more than 2 cc. may be required. The average multipara may require one such injection; the average primipara about three injections, at intervals of one hour for the first, two hours for the second and three to four hours before a third is needed.

In a group of 170 patients closely observed, 75 were primiparas and 95 multiparas; 164 (96.4 per cent) delivered spontaneously; 6 had low forceps delivery; 152 (89.4 per cent) reported complete amnesia; 18 reported partial amnesia.

During the second stage of labor, 3 patients became unmanageable but were controlled by administration of  $\frac{1}{8}$  grain (0.0075 gm.) of morphine sulfate intravenously. Extreme restlessness occurred in 34 (20 per cent) in the latter part of the second stage and these were controlled by an additional injection of 1 to 3 cc. of the pentobarbital-sodium scopolamine hydrobromide mixture. Severe drop in blood pressure occurred in 2 instances, associated with too rapid injection of the drugs; both responded to 2 mg. of neo-synephrine hydrochloride intravenously administered and oxygen in high concentration given by means of an anesthetic bag and mask. One patient to whom the drugs were administered too rapidly and the airway not closely observed, showed a shallow respiratory exchange, tachycardia and cyanosis; establishment of an adequate airway and use of oxygen in an anesthetic apparatus were effective in a few minutes. Nausea and vomiting in 3 patients was controlled with small additional doses of the drugs. Cyclopropane by the carbon dioxide-absorption technic or open drop ether were administered for repair of episiotomy.

regardless of economic status, only 2 to 10 per cent of women have met the recommended requirements. The occurrence during the last months of pregnancy of indications of anemia, pellagra, neuritis or other deficiency syndromes may indicate iron, protein, niacin deficiency or a biochemical deficiency of the entire B complex.

Polyneuritis of pregnancy results from inadequate amounts of thiamine; synthetic thiamine in doses of 5 to 20 mgm. will relieve this condition. Macrocytic anemia of pregnancy with nausea, vomiting or anorexia and a red cell count often below a million, may be treated by a daily dosage (approximately 10 mgm.) of synthetic folic acid (bactobacillus casein factor), given orally or parenterally. Niacin deficiency is indicated by nervousness, insomnia, irritability and headache, sometimes progressing to psychotic conditions. These symptoms are a sign of mixed B complex deficiency in which thiamin and niacin are most important.

For treatment of vomiting of pregnancy, vitamin B<sub>6</sub> (pyridoxine) has been recommended by some investigators, using 50 to 2500 mgm. daily, orally and parenterally. No evidence of deficiency in vitamin B<sub>6</sub> has been noted in these women. The authors consider that pyridoxine has a soporific effect only. Scurvy, a vitamin C deficiency disease, seldom occurs in pregnancy. Deficiency of fat soluble vitamins, except vitamin K, is seldom observed. Administration of vitamin K parenterally one hour before delivery is recommended, to prevent hemorrhagic disease of the newborn. That severe maternal vitamin A deficiency causes congenital blindness in offspring has been demonstrated experimentally.

Vitamin D deficiency is rare in pregnant women. Burke found that calcium deficiency may cause defective deciduous teeth in the infant; Finola et al. reported that supplements of dicalcium phosphate and vitamin D prevent decrease of blood calcium. However, an excess of vitamin D and calcium may cause calcification of the placenta and of the fetal kidney. The value of administration of vitamin E as a preventive and therapeutic measure for abruptio placentae and threatened abortion has not been confirmed.

Microcytic hypochromic anemia is common in pregnancy and is treated by daily administration of 1 gram of ferrous sulfate or ferrous gluconate in divided doses. In cases of achlorhydria in which ionization is poor, the dose of iron must be trebled. Liver extract is ineffective. Plasma proteins decrease during pregnancy and if protein dietary is low, the hemoglobin is poorly formed and available calcium which is absorbed is reduced accordingly. Protein deficiency is a prominent predisposing factor in toxemia of pregnancy, as shown by many writers. Vilter and his coworkers feel that if protein is adequate, toxemia will not develop. Adequate protein also aids in producing successful lactation. Reasonable control of weight is advised, chiefly through reduction of fats and carbohydrates, without reduction of nutritional essentials.

One quart of milk, two servings of meat, an egg, green and yellow vegetables, citrus fruits and a whole grain cereal daily are advised. In nutritive failure the diet should provide 3500 to 4000 calories, including 120 to 150 grams of protein and adequate vitamins and minerals. The following synthetic vitamins should

In correlating the results, it was attempted to determine how far the value of hemoglobin, plasma ascorbic acid or plasma phosphatase found in early pregnancy enables a forecast to be made of the corresponding values in late pregnancy, and also to find whether the possession of a low hemoglobin or ascorbic acid, or of a high phosphatase, imply that other biochemical indices will also be abnormal. The correlations indicate that only in the case of hemoglobin can the result in late pregnancy be forecast from early pregnancy. No evidence exists of any state of general nutritional deficiency in the population under consideration.

The mean income levels show that in this survey, income level apparently had no bearing on the nutritional state.

## NUTRITION IN PREGNANCY

### EFFECTS OF DIETARY DEFICIENCY IN PREGNANCY AND DETECTION OF NUTRITIONAL DEFICIENCY DISEASES

CARL F. VILTER, DORCAS MORGAN AND TOM D. SPIES

Surg., Gynec. & Obst., 83: 561-71, 1946

Nutritional deficiencies will occur in pregnant and lactating women unless there is judicious regulation of the dietary. The most important causative factors are failure of ingestion and increased metabolic demands. The table of minimum dietary requirements established by the Food and Nutrition Board of the National Research Council (1941) indicates the increased needs:

TABLE I

*Recommended daily allowances of specific nutrients for the non-pregnant, pregnant and lactating woman*

NUTRIENTS	NON-PREGNANT	PREGNANT (LATTER PERIOD)	LACTATING
Calories.....	2500	2500	3000
Protein (gm.).....	60	85	100
Calcium (mgm.).....	0.8	1.5	2.0
Iron (mgm.).....	12	15	15
Vitamin A (I.U.).....	5000	6000	8000
Thiamin (mgm.).....	1.5	1.8	2.3
Ascorbic acid (mgm.).....	70	100	150
Riboflavin (mgm.).....	2.2	2.5	3.0
Nicotinic acid (mgm.).....	15	18	23
Vitamin D (I.U.).....	+	400-800	400-800

Since the needs of the fetus are preferential, the mother suffers from any deficiency rather than the fetus. Studies by various writers have shown that



pregnancy gave birth to a 5 lb., 14 oz. girl. The patient who had gained the most weight, 48.25 lbs., was delivered of a 6 lb., 5.5 oz. female. The average maternal weight gain for the series was 21.05 pounds, with an average weight of 7 lb., 6 oz. for the newborns.

After considerable statistical analysis of the various factors the author concluded that there was no correlation between the maternal weight gain during pregnancy and the weight of the baby at birth. The average weight of males exceeded that of females. There is no relationship between the age of the mother, her weight gain during pregnancy, and the weight of the newborn infant. Although the average maternal weight gain and the average weight of newborns of multiparas were greater than those of primiparas, the differences were slight and of no significance.

## DANGERS INVOLVED IN THE INDUCTION OF PARTURITION BY ABUREL'S METHOD

MANUEL LUIS PEREZ AND EDUARD MARIO BALDI

An. Inst. Matern. y Asist. Soc., 7: 26-36, 1946

Aburel's method consists in the injection of 37.5% NaCl solution into the uterus through the median line of the abdominal wall. It is relatively simple and is innocuous for mother and fetus; but the fetal movements should be watched carefully after the injection. Accidents and fetal deaths have occurred, and various authors recommend the method with reservations.

Twenty-five cases are tabulated with indications for intervention. In three of these the Aburel method was unsatisfactory, demonstrating the chances of accident inherent in the puncture even in skilled hands. Details of two of these deliveries are given. In one the needle entered the uterus, as was indicated by the withdrawal of amniotic fluid; but an inadvertent movement thrust the point into the uterine wall and caused the injection to be made "interparietally" with a consequent necrosis. This necrosis developed into a peritonitis from which the mother died. In the second case, birth of the child came naturally 10 hours after injection of saline by Aburel's method. The child exhibited a severe edema of the whole of one leg, which necrosis intensified, till the death of the child the following day. The mother recovered without injury.

It is possible, in the authors' opinion, that another solution might be safer for injection, namely, 25% glucose instead of the 37.5% NaCl used by Aburel. However, the concentration of the solution in this case is more important than its substance; a very hypertonic solution is injurious to the maternal and fetal tissues.

be supplied: thiamine, 10 mgm., riboflavin, 5 mgm., niacin, 50 mgm., ascorbic acid, 75 mgm. A supplement of 300 to 500 mgm. of niacin is required if pellagrous glossitis is present; additional protein is required if there is protein deficiency, to raise the amount to 150 grams. Vitamin B complex, such as Brewer's yeast (60 gm.), crude liver extract or wheat germ, may be added as needed.

(Although it may seem presumptuous for an obstetrician to question the recommendations of these authors, who are eminent nutritionists, there is one recommendation in this paper which would seem debatable, to say the least, namely, that a diet of 3500 to 4000 calories be provided for pregnant women suffering from "nutritive failure". This statement is made in the text and repeated in the summary so that it stands out as a most important piece of advice. In cases of actual starvation in pregnancy with weight loss, this recommendation might be valid, but the two patients whose kodakrome photographs accompany this paper and who are cited as examples of marked dietary deficiency in pregnancy, do not appear to be underweight and one is quite plainly obese. Is it not proteins, minerals and vitamins which these women need rather than such a huge caloric allowance?—Ed.)

## THE RELATIONSHIP OF MATERNAL WEIGHT GAIN TO THE WEIGHT OF THE NEWBORN INFANT

JOSEPH KLEIN

*Am. J. Obst. & Gynec.*, 52: 574-580, 1946

Most physicians who supervise prenatal care caution their patients against excessive weight gain during pregnancy because in their opinion the size of the fetus may be controlled which, especially in the presence of a pelvic contraction, would reduce the incidence of disproportion with its attendant hazards. Because of the many conflicting and controversial reports in the previous literature the author felt that a statistical analysis of a moderately large series of cases was warranted to throw further light on the relationship, if any, of maternal weight gain, to the weight of the newborn infant.

During his tenure as Chief of the Obstetric and Gynecologic Section of a military hospital from May 20, 1944 to November 29, 1945, the writer delivered 605 women of 610 babies. For the purpose of comparing the statistics covering these patients with those of other authors, 567 cases were selected for a survey based upon the following criteria:

1. Single pregnancies in which the patient began antepartum care prior to the twelfth week of gestation and was observed at regular intervals until term.
2. Onset of labor was spontaneous with delivery of a normal living infant.
3. With the exception of two well compensated rheumatic cardiacs, the parturients had had no pre-existing disease.

In this group of cases, 408 primiparas and 159 multiparas were delivered of 282 male and 285 female infants. The heaviest baby weighed 10 pounds, 7.25 oz. at birth; the lightest 5 lbs., 4.5 oz.; one mother who had lost 3.25 pounds during

A total of 221 women were studied between December, 1944 and December, 1945 at the Regional Hospital, Fort Knox, Kentucky; McCaw General Hospital, Walla Walla, Washington; and the Bushnell General Hospital, Brigham City, Utah.

The routine included standing for one minute the first day postpartum, sitting in a chair for five minutes the second day, abdominal exercises in bed and two five minute sitting episodes the third day, knee chest exercises and two thirty minute sitting periods the fourth day, walking about and toilet privileges on the fifth or sixth day, a shower on the seventh day, and discharge from the hospital on the eight day when desired or necessary.

The incidence of complication, subinvolution, prolonged lochia rubra, episiotomy breakdown, infections, and uterine retroversion was not greater than that found in any series of women treated puerperally with bed rest for 6 or 7 days and hospitalization to the tenth day. The author felt that early puerperal rising in uncomplicated cases of childbirth is desirable and without danger or unfavorable sequelae. The women have a sense of well being and are benefitted psychologically not only during the puerperium but also in their attitude toward the entire episode of pregnancy. They are prepared by the regimen of increasing activity to leave the hospital by the eighth day postpartum, and their convalescence at home is shortened considerably.

## FROG TEST (*XENOPUS LAEVIS*) FOR PREGNANCY

C. B. SANDERS

Texas J. M., 42: 375-, 1946

A discussion of the frog test as a simple, rapid and accurate test for pregnancy is given with emphasis on the fact that in the literature the test has proven greater than 98 per cent accurate. The errors are only in false negatives and in these the test became positive after the pregnancy had progressed somewhat further.

The test is based on the fact that gonadotropins will induce ovulation in animals. The patient brings in the first voided urine specimen in the morning. 45 ml. of the urine is acidified to a pH of 4 using 20 per cent HCl and bromphenyl blue as an indicator. 5 ml. of a 20 per cent washed acid kaolin solution is added to the urine and the specimen shaken in a shaking machine for 10 minutes. The kaolin absorbs the hormone. The suspension is then centrifuged for 5 minutes and the supernatant fluid is discarded. To the kaolin remaining 2 ml. of 10 per cent NaOH is mixed and the specimen recentrifuged. The supernatant fluid containing the hormone is acidified to a pH of 6 with 5 per cent of HCl with nitrazene paper as an indicator. There is then 2-2½ ml. of fluid containing the hormone which is injected into the dorsal lymph sac of the female African frog

## GRAPHIC PORTRAYAL OF RELATIVE PELVIC SIZE

W. F. MENGERT AND W. C. ELLER

Am. J. Obst. &amp; Gynec., 52: 1032-1040, 1946

The writers present a method of graphic portrayal of size and approximate shape of inlet, mid-, and outlet planes of the pelvis. A diagram is made of the 3 pelvic levels, using ideal shapes for the respective levels. In addition, a centimeter scale is incorporated directly in the anteroposterior and transverse diameters. In practice, an outline of each pelvic plane in the patient is sketched on the basic diagram of its normal counterpart. The transverse diameter is exactly bisected by the anteroposterior unless there is unilateral pelvic distortion. The point at which the transverse diameter crosses the anteroposterior of each of the 3 planes is variable, and must be determined by measurement of the posterior sagittal diameter. This can be accomplished for the inlet and midplane only by roentgenographic means.

A knowledge of 6 pelvic diameters will give all practical information necessary for evaluation of pelvic capacity. These diameters are the anteroposterior and transverse of the inlet and midplane, and the posterior sagittal and transverse of the outlet. The anteroposterior measurement of the inlet, the transverse and posterior sagittal of the outlet, and the transverse of the midplane can be obtained or closely estimated manually. The transverse measurement of the inlet and the anteroposterior of the midplane are measured by roentgenographic means. When roentgenographic mensuration is performed, it is obviously better to make all measurements from the films than to depend in part upon manual mensuration. 4 figures.

## EARLY PUERPERAL RISING

ARTHUR G. KING

Am. J. Obst. &amp; Gynec., 52: 657-660, 1946

Stimulated by the success which has attended the early ambulation of general surgical patients, the author of this study undertook a similar program in the treatment of women immediately after childbirth. The basic work of Bernard Newburger published posthumously in 1943 showed that in experimental rats postoperative activity accelerated the early phase of healing of incised tissues. It was felt that the physiology of the pregnant and parturient woman did not differ sufficiently from that of other surgical conditions to anticipate a less favorable result than that obtained either in experimental animals or human surgical cases.

A total of 221 women were studied between December, 1944 and December, 1945 at the Regional Hospital, Fort Knox, Kentucky; McCaw General Hospital, Walla Walla, Washington; and the Bushnell General Hospital, Brigham City, Utah.

The routine included standing for one minute the first day postpartum, sitting in a chair for five minutes the second day, abdominal exercises in bed and two five minute sitting episodes the third day, knee chest exercises and two thirty minute sitting periods the fourth day, walking about and toilet privileges on the fifth or sixth day, a shower on the seventh day, and discharge from the hospital on the eighth day when desired or necessary.

The incidence of complication, subinvolution, prolonged lochia rubra, episiotomy breakdown, infections, and uterine retroversion was not greater than that found in any series of women treated puerperally with bed rest for 6 or 7 days and hospitalization to the tenth day. The author felt that early puerperal rising in uncomplicated cases of childbirth is desirable and without danger or unfavorable sequelae. The women have a sense of well being and are benefitted psychologically not only during the puerperium but also in their attitude toward the entire episode of pregnancy. They are prepared by the regimen of increasing activity to leave the hospital by the eighth day postpartum, and their convalescence at home is shortened considerably.

## FROG TEST (*XENOPUS LAEVIS*) FOR PREGNANCY

C. B. SANDERS

Texas J. M., 42: 375-, 1946

A discussion of the frog test as a simple, rapid and accurate test for pregnancy is given with emphasis on the fact that in the literature the test has proven greater than 98 per cent accurate. The errors are only in false negatives and in these the test became positive after the pregnancy had progressed somewhat further.

The test is based on the fact that gonadotropins will induce ovulation in animals. The patient brings in the first voided urine specimen in the morning. 45 ml. of the urine is acidified to a pH of 4 using 20 per cent HCl and bromphenyl blue as an indicator. 5 ml. of a 20 per cent washed acid kaolin solution is added to the urine and the specimen shaken in a shaking machine for 10 minutes. The kaolin absorbs the hormone. The suspension is then centrifuged for 5 minutes and the supernatant fluid is discarded. To the kaolin remaining 2 ml. of 10 per cent NaOH is mixed and the specimen recentrifuged. The supernatant fluid containing the hormone is acidified to a pH of 6 with 5 per cent of HCl with nitrazene paper as an indicator. There is then 2-2½ ml. of fluid containing the hormone which is injected into the dorsal lymph sac of the female African frog

(*Xenopus laevis*). (One should select frogs with bulging lungs and a purplish red cloaca since these have full egg sacs.) Injections are usually made in the late afternoon and kept over night for ovulation as the frog ovulates in darkness.

If the specimen contains hormones the frog will begin to lay eggs within 4 to 18 hours. If the frog has passed no eggs in 18 hours the test is negative.

It is suggested that 2 frogs be used for each test as a double check. The frogs injected with a specimen not containing hormone may be used again in one week. Those which lay eggs following injection of a specimen must be rested for one month.

## PATHOLOGY OF PREGNANCY

### FRIEDMAN REACTION IN CEREBRO-SPINAL FLUID, ITS IMPORTANCE IN DIAGNOSIS OF MOLE

MARCIAL GARCIA-HUIDOBRO AND LEONARDO PAREDES

Bol. Soc. Chile. Obs. y Gin., 11: 31, 1946

Pre-operative diagnosis of hydatiform mole is often difficult even with hormone studies in blood and urine. In this as in chorionepithelioma there exist high titers of hormones, ranging from 20,000 to 500,000 B. H. units, which is much higher than in normal pregnancy. These estimations require well equipped laboratories with numerous animals, so that a simpler method of diagnosing mole or chorionepithelioma is desirable.

In 1929 Erhardt found Ascheim-Zondek reactions in the spinal fluid of 50 cases, children and adults, of which 18 were pregnancies complicated by general infection or toxemia. In none of these were there positive type II or III reactions (hemorrhage or corpus luteum); and only 4 cases of toxemia of pregnancy and one of pregnancy with carcinoma of the cervix gave reaction type I (matured follicle). Zondek (1937) and Mathieu (1939) report normal pregnancy as giving a negative reaction in spinal fluid, while mole and chorionepithelioma give positive reactions. Other authors report similar results but do not explain the possible cause of the different reactions of spinal fluid in normal pregnancy and in mole.

Our work is based on 13 Friedman reactions with spinal fluid from patients with hydatiform mole and in normal pregnancy. To verify the reaction 5 to 10 cc. of spinal fluid were injected intravenously into adult female rabbits, previously isolated for 30 days. Result was the same as a Friedman reaction with urine after 48 hours. There was no death nor intolerance among the rabbits. All cases of mole and normal pregnancy were verified concomitantly by titration of chorionic gonadotrophin in the urine. The cases of mole with positive reaction in the spinal fluid had a urine titer above 10,000 B. H. units (between 10,000 & 40,000), while normal pregnancies had titers of less than 1000 B. H. units. A positive reaction of spinal fluid seems to depend on a high concentration of chorionic gonadotrophin in the blood. This hormone would necessarily have to have a threshold of above 10,000 units in the blood to pass the meninges and spill into the spinal fluid a concentration sufficient to yield a positive reaction in 10 cc.

Studies were made on 13 Friedman reactions with spinal fluid. Of 4 patients with molar pregnancies 3 gave positive and one a negative result. Molar pregnancy was verified by interruption of gestation. The one negative is attributed to the scant amount of spinal fluid used. In 5 cases samples of spinal fluid from molar pregnancies 2, 10 and 48 hours after curettage all gave positive results. But 4 days and 7 days after these molar abortions, results were negative. Four

control cases, 2 in the first half of pregnancy, 1 with twins and 1 an eclamptic, were all negative. All the positive reactions with spinal fluid had a high titer for urinary chorionic gonadotrophin, from 10,000 to 40,000 B. H. units, with the exception of one nephritic patient whose urinary concentration was only 1000 units. These cases indicate that Friedman reaction using 10 cc. spinal fluid is useful in confirming the diagnosis of hydatiform mole.

(As the author points out, positive Friedman reactions in the spinal fluid depend on the height of the concentration of chorionic gonadotrophin in the blood. While most cases of hydatidiform mole show a great increase of this hormone in the blood, it is well known that occasional cases do not; and conversely, in normal pregnancy now and then, the concentration in the blood may be extremely high, especially between the 10th and 12th week. It is due to these disparities presumably that the Friedman reaction of the spinal fluid is sometimes negative in hydatidiform mole (as well as in chorionepithelioma) and occasionally positive in normal pregnancy. Thus, Hashimoto has reported positive Ascheim-Zondek reactions in 5 cases of normal pregnancy using 18-20 cc. of spinal fluid, while Palmer found 6 positive tests in the spinal fluid among 42 normal pregnant women and 1 negative spinal fluid reaction in a patient with chorionepithelioma (See Schulze: *California & West. Med.*, 57: 292, 1942). Likewise, a number of outright cases of hydatidiform mole and chorionepithelioma have been reported in which neither the blood nor the urine contained chorionic gonadotrophin. Hence, while these hormonal tests are valuable diagnostic adjuncts, they must never be regarded as wholly dependable indices whether done on spinal fluid, blood or urine.—Ed.)

## SOME ASPECTS OF HYDATIFORM MOLE

HECTOR CABRERA S.

Bol. Soc. Chile. Obs. y Gin., 11: 107-111, 1946

This article is a study of data on 94 cases of hydatiform mole observed between 1934 and 1946. Other authors have percentages ranging from 0.33 per 1000 pregnancies to 4 per 1000. The authors give the following details:

<i>Year</i>	<i>Total pregnancies</i>	<i>Total abortions</i>	<i>M</i> <i>cases</i>
1934	5793	1068	9
1935	6222	1312	8
1936	6067	1455	3
1937	5735	1371	6
1938	6089	1456	6
1939	6428	1307	8
1940	6613	1107	13
1941	6667	1291	11
1942	6168	1053	5
1943	5726	1004	7
1944	6433	1075	12
1945	6590	1043	4
1946	3416	600	2
	<hr/> 77947	<hr/> 15142	<hr/> 94

The percentages are 1.2 per 1000 pregnancies and 6.2 per 1000 abortions.



Age distribution was 15 cases at 20 years, 43 between 21 and 30 years, 27 between 31 and 40 years, 8 between 41 and 50 years, and one at 54 years. Mole is much more frequent in multiparas: the authors had only 12.6% in primiparæ. Mole appeared at any time during gestation; they encountered the condition as follows: 1 case at 1 month, 22 cases at 2, 36 cases at 3, 23 cases at 4, 6 cases at 5, 3 cases at 6, and 1 case at seven months.

The etiopathology of mole is not well established. There is degeneration of the fetus, with progesterone or chorionic gonadotrophin suggested as causes. Other authors allude to endometritis, a lesion of the corpus luteum, to vascular lesions, etc. The pathologic anatomy is well known macroscopically as a cluster of transparent vesicles resembling a bunch of grapes, filled with a clear viscous substance. It may be total or partial, hollow or solid. If partial, the embryo still exists, almost always dead and atrophied, but occasionally alive and developing. Microscopically the mole appears to be multinuclear protoplasmic masses in full vascular degeneration.

The pregnancy seems normal at first, then toxic symptoms appear. Later hemorrhage is the predominant sign, with painless spontaneous loss of red blood. The elevation of the uterus is greater than that expected at the particular stage of pregnancy, and seems soft and doughy to pressure. Clinical diagnosis may rest on expulsion of hydatid vesicles through the vagina, confirmed by radiographic examination.

The Friedman reaction is always positive in cases of mole pregnancy. The authors have used this test since 1944. Zondek proved that the concentration of chorionic gonadotrophin in mole pregnancies is more than the 60,000 rabbit units recorded by Brindeau and Hinglais; but it may be assumed present with 30,000 units. The authors have injected rabbits with 1 cc.,  $\frac{1}{4}$  cc. and  $\frac{1}{8}$  cc. of serum finding 1000, 40,000 and 60,000 units respectively. They usually inject 3 rabbits and examine the tissues after 48 hours. The reaction will continue positive 4 to 6 weeks after evacuation of the mole without pathologic significance; but sometimes degeneration begins in 10 to 15 days.

The hormone is also titrated in the blood; if it falls to zero the patient is out of danger. If it rises, a malignant degeneration is almost certain. They check test their patients for several months after evacuation. In general mole develops to a spontaneous abortion between the 3rd and 4th month. Elimination is incomplete in most cases, and often there is sufficient hemorrhage to require transfusions. After expulsion of the mole, hemorrhage ceases and the uterus begins involution. Lutein cysts which may accompany mole disappear by the second month after expulsion. If hemorrhages recur, new tests must be made. Prognosis is poor according to some authors; but if early diagnosis is made such percentages may be reduced. Their own experience records a mortality of 0.94%. Diagnosis of mole pregnancy requires evacuation of the uterus. Extreme care must be taken in curettage to avoid tears or perforation. In some cases the authors used a finger, in some an instrument, and had no complications. None of their patients developed a chorionepithelioma, but they are still required to report for periodic examination.

## PERFORATING CHORIONEPITHELIOMA

JUAN ALLEMAND D. AND ALBERTO LUCCHINI

Bol. Soc. Chile. Obs. y Gin., 11: 133-136, 1946

This condition is rare but very grave and its treatment has usually produced poor results. A case is described solely to contribute to the better knowledge of this malady.

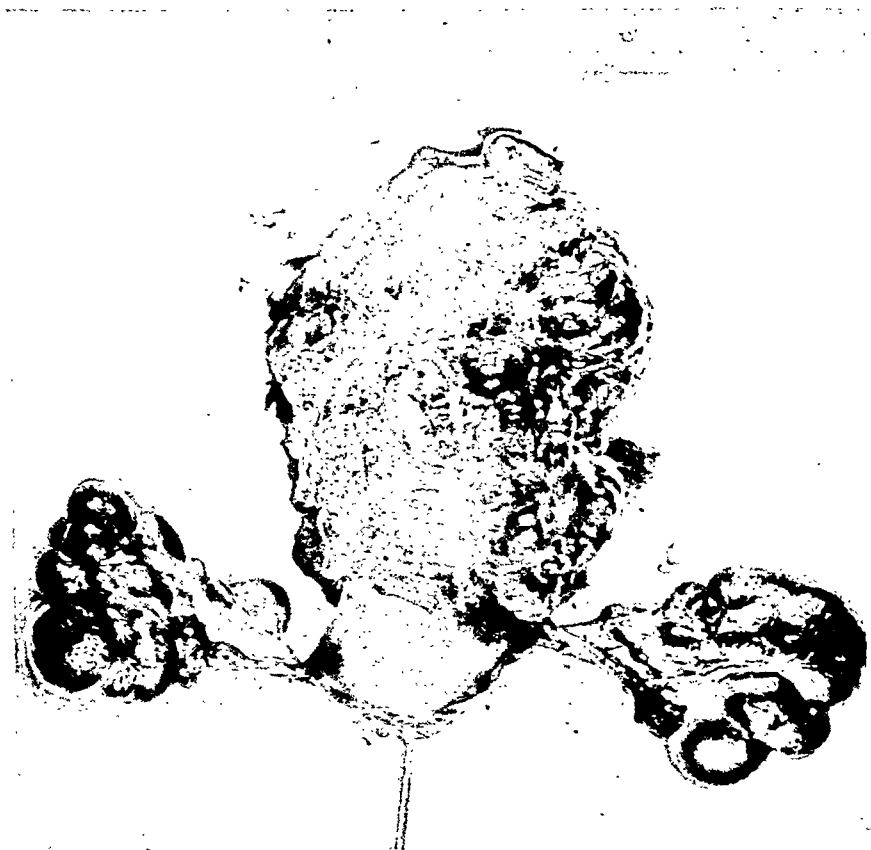


FIG. 11. CHORIONEPITHELIOMA GROWING IN PERITONEAL CAVITY 81 DAYS AFTER PERFORATION OF THE UTERUS (Editor's case)

A 25 year old woman had had a two months abortion two years previously and recovered without incident. She entered the hospital complaining of four months' amenorrhea and intense intermittent pain in the left iliac fossa, nausea, lack of appetite and occasional vomiting. The diagnosis was left hematocele and probable pregnancy. Laparotomy disclosed a large amount of blood in the peritoneum, the tubes and ovaries uninjured, but the uterus the size of a big

fist and spongy. On its posterior face was the sort of growth about the size of a quarter, which bled profusely. The friable texture of the tissue prohibited hemostatic measures, so a sub-total hysterectomy was performed. Five grams of sulfa was placed in the peritoneum and the wound closed. A transfusion of 1 liter of blood, physiological saline and glucose was given, and Tonicardiol, one ampule administered every 3 hours. Next day she received 20,000 units of penicillin every 3 hours. Later transfusions and more penicillin were given, and by the ninth day the wound showed a satisfactory cicatrice. The excised tissue was reported as uterine wall with extensive destruction and infiltration by a bloody and necrotic mass. Histologic examination confirmed this as chorionepithelioma.

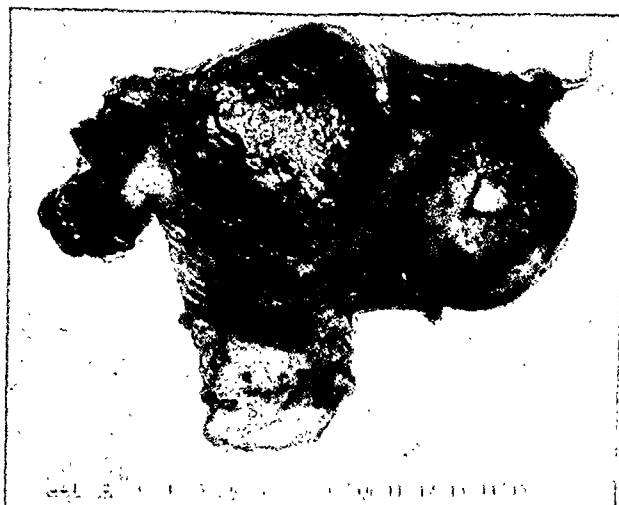


FIG. 12. CHORIONEPITHELIOMA ABOUT TO PERFORATE UTERUS

The posterior aspect of the uterus is shown. It is shaggy, particularly toward the left, because of separation of adhesions. The right ovary is cystic and bound to the uterus. On the upper right quadrant of the uterine surface, the penetrating chorionepithelioma is clearly visible as a bluish-black nodule. (Editor's case)

Since radiotherapy is not successful in such cases, the authors decided to administer high and continuous doses of progesterone, because of the earlier successes with this therapy reported by Coutts and Vargas. They began treatment 11 days after the operation, administering 10 mg. beta metrosin intramuscularly for 4 days. On the 5th day they implanted subcutaneously 100 mg. crystallized progesterone in pellets. The metrosin injections were continued 12 days longer. Friedman tests at this stage, 8 and 18 days later were all strongly positive. Radiogram showed an extensive metastasis. They then implanted 200 mg. of methyl testosterone. The patient showed general improvement in a few days and was allowed to return home. The Friedman test continued positive and anemia was evident. She developed a fever with symptoms of pneumonia, which, however, responded to treatment with sulfa-

thiazol. But she continued to fail, and refusing to reenter the hospital, she died one month later. Hormonal treatment proved of no help.

(Perforation of the uterine wall by chorionepithelioma with free bleeding into the peritoneal cavity is probably a more common complication of this neoplasm than is generally realized. Thus, Acosta-Sison and Espaniola encountered 8 examples of this accident in 32 cases of chorionepithelioma or in 25 per cent (*Am. J. Obstet. & Gynec.*, 42: 878, 1941). In Karl Wilson's series of 5 cases there was one such perforation (*Am. J. Obstet. & Gynec.*, 38: 824, 1939). In 1942 Rosenbloom reported a dramatic case of fatal intra-abdominal hemorrhage following penetration of the uterine wall by a chorionepithelioma in which the hole made by the growing neoplastic mass was 4 by 2 cm. (*Am. J. Obstet. & Gynec.*, 43: 133, 1942).

Perforating chorionepithelioma was discussed in some detail by Anspach and Hoffman in 1931 in a paper which analyzed 7 cases from the literature and 1 of their own (*Am. J. Obstet. & Gynec.*, 22: 239, 1931). They point out that the clinical course of most of these cases so closely resembled a ruptured ectopic gestation that this diagnosis was made 5 times in the 8 cases reported. In 3 cases uterine hemorrhage previous to the rupture was noted; in 3 there has been a period of amenorrhea; and in 2 there was spotting. In 3 cases the tumor involved the uterine wall and the endometrial surface was free, the growth being intramural; in 3 a similar condition probably existed but the reports were not clear; in 2 the endometrial cavity was involved to a small degree. It is significant and worthy of note that in 3 cases the acute symptoms developed almost immediately after a pelvic examination. The authors advise therefore that great care should be taken in making a pelvic examination in suspected cases.

Occasionally, in badly neglected cases of these perforating chorionepitheliomas, the uterine rupture goes untreated and the neoplasm continues its growth outside of the uterus. Such a case once came under my care in China some 3 months after the patient had exhibited in another hospital as clear-cut picture as you can imagine of an acute abdominal accident with internal bleeding. At operation, done 81 days after the abdominal episode, an oval mass which was of the size and shape of a 6 months pregnancy was found arising from the pelvis. Its covering resembled exactly the maternal surface of the placenta. Further exploration made it clear that this mass represented the extension of a chorionepithelioma which had perforated the uterus, presumably at the time of the abdominal calamity mentioned above. A photograph of the specimen removed at operation is reproduced as Fig. 11 where it may be seen that the uterus, easily identified by its peritoneal covering, is relatively small in comparison to the somewhat lobulated mass of tumor springing from it. The patient died 5 weeks later of pulmonary, hepatic and cerebral metastases.

In addition to these patients in which actual perforation has taken place, cases of chorionepithelioma are occasionally seen in which penetration of the serosal covering of the uterus is about to occur. Such a case is illustrated in Fig. 12. The patient was a 20 year old negroes who was admitted to the hospital complaining of chills, fever and vaginal bleeding of 36 hours duration. She had had a full term pregnancy 2 years before and a spontaneous abortion 6 months previously. She was treated for several days as an infected abortion until failure to pass tissue together with other atypical manifestations suggested the possibility of chorionepithelioma, and an X-ray of the chest was taken. This showed several metastatic nodules in the lungs; and a serum gonadotrophin assay revealed an extremely high level. At operation the fundus of the uterus showed, on its posterior aspect and to the right, a protruding bluish-black nodule about 4 mm. in diameter; the peritoneum was displaced outward but was still intact. Subsequent study of the uterus indicated that the nodule was a direct extension of chorionepithelioma tissue from the endometrial surface. Despite deep X-ray therapy of the chest and pelvis pushed to the point of toxicity, the patient died 101 days post-operative of extension of the pulmonary metastases.—Ed.)

## HYDRAMNIOS

L. C. RIVETT

Am. J. Obst. &amp; Gynec., 52: 890-893

This paper constitutes the Joseph Brettauer Memorial Lecture, presented at the Sixty-Ninth Annual Meeting of the American Gynecological Society. In it the author discusses the definition, etiology, incidence and treatment of hydramnios, with special reference to a method of treatment which he has found effective.

Hydramnios is defined as the condition existing when the amount of liquor amnii exceeds 5 pints (3000 cc.). In about 50 per cent of cases one finds gross fetal maldevelopment; in about 50 per cent of cases one can find no cause whatsoever. Hydramnios occurs about once in 200 pregnancies. Most commonly it appears to occur between the twentieth and twenty-eighth week of gestation. When the amount of liquor exceeds 5 pints, it is likely to cause marked maternal distress, necessitating treatment. The writer finds that the usual method of treatment is to puncture the membrane through the cervical canal. As the majority of cases occur before viability of the fetus, this procedure, by producing the onset of labor, inevitably kills the baby or babies.

The author's method of treating hydramnios is by puncturing the amniotic sac and withdrawing the excessive liquor. A spinal trocar and cannula is prepared. With the patient lying on her back, the abdomen is palpated and an area chosen, usually above the umbilicus, where there is marked fluctuation and where fetal parts cannot be palpated. The skin is painted with iodine and a skin puncture made with a small tenotomy knife. The cannula is inserted through the abdominal wall, through the uterus and into the amniotic sac. Very rarely is the liquor under pressure, so the cannula is attached to a suction pump and as much liquor as possible is withdrawn. Following the procedure, morphia is administered to discourage uterine contractions. A certain number of cases do go into labor; a certain number do not. In most cases the excessive liquor will reaccumulate in 3 or 4 weeks and the procedure may be repeated. Some cases do not produce further hydramnios.

After eliminating cases in which the first aspiration was performed later than 35 weeks' gestation, the author finds that live babies resulted in over 25 per cent of cases which required treatment before viability of the fetus. In all of these cases relieving the tension by puncture of the membrane via the cervix would have resulted in labor and death of the fetus.

The writer's series comprises only about 50 cases, and he asks that this method of treatment be given a fair trial.

## ENDOMETRIOSIS IN ASSOCIATION WITH PREGNANCY

F. R. LOCK AND R. T. MEYERS

Am. J. Obst. &amp; Gynec., 52: 556-563, 1946

The apparent increase in the incidence of endometriosis has been distressing to the authors of this report. Sampson has reported finding endometriosis in 43 per cent of abdominal operations performed on women between 30 and 50 years of age. Meigs made a gross diagnosis of endometriosis in 36 per cent of 400 consecutive female patients at laparotomy, with pathologic confirmation in 28 per cent. Very few reports concerning endometriosis associated with pregnancy had been reported in the literature until the excellent review by Scott in 1944, who found only 47 previously reported cases to which he added two of his own. A brief summary of Scott's paper is included in this report by Lock and Meyers. Scott was sufficiently impressed by the frequency with which pregnancy follows conservative management of endometriosis to make a strong plea for preserving the childbearing function in these relatively infertile women, in spite of previous reports that when endometriosis and pregnancy are associated, abortion, premature labor and extrauterine pregnancy may readily occur, in addition to the complications of labor with rupture of the uterus, atony during cesarean section, or critical postpartum hemorrhage.

The essayists presented 2 case reports. The first case was that of a 28 year old white female who at the time of laparotomy had a fused cystic mass approximately 7 cm. in diameter in the left tube and ovary. The right tube was normal but the right ovary contained a cyst 5 cm. in diameter filled with chocolate brown material. The uterus was freed with some difficulty from the peritoneum of the cul-de-sac, and the posterior wall was found to be diffusely infiltrated with thick material. In addition there were 3 isolated nodules measuring 2-2.5 cm. in diameter on the posterior-superior surface of the uterus. Because of the patient's wish total hysterectomy was not done and instead a left salpingo-oophorectomy and a fundectomy were performed. The cystic cavity in the right ovary was evacuated, its wall destroyed with the actual cautery, and the ovary then closed with interrupted sutures of 000 chromic catgut. Approximately two-thirds of the corpus, including an estimated one-half of the endometrial cavity, was removed. The uterus was then closed with three rows of continuous 000 chromic catgut sutures. The superior hypogastric plexus was removed also. Twenty-seven months later the patient delivered a normal female child weighing 2780 grams by elective low forceps procedure under cyclopropane and oxygen anesthesia. The patient was followed for three months during which time no complications had developed.

The second case was treated conservatively with testosterone (Metandren Linguets) 10 mg. daily until 300 mg. had been ingested. The patient, a 23 year old white woman subsequently became pregnant and delivered a male child weighing 3010 grams spontaneously. Six months later a total abdominal hys-

terectomy was performed. Pathologic examination showed adenomyosis of the uterus.

Few specific case reports of uncomplicated pregnancies in patients with endometriosis are to be found, but a careful search by the authors revealed that such cases are casually mentioned in articles dealing primarily with the gynecologic aspects of endometriosis. An analysis of five such articles showed that approximately a third of the patients treated conservatively can successfully conceive, and that a vast majority of such patients can have a normal pregnancy. For this reason the authors wish to re-emphasize the desirability of employing procedures which conserve the childbearing function in youthful patients with endometriosis.

## THE EFFECT OF ESSENTIAL HYPERTENSION ON PREGNANCY

JOHN A. SHARKEY AND CATHERINE B. HESS.

Am. J. Obst. & Gynec., 52: 672-676, 1946

The author defines the hypertensive pregnant patient as either having essential hypertension, malignant hypertension, arterial hypertension of known etiology or pre-eclampsia. This report is only concerned with essential hypertension discovered during pregnancy and its effect on the health of the mother and child, and also upon the mother after termination of such a pregnancy. The pregnant patient with hypertension asks the following questions:

- (1) Will pregnancy aggravate the hypertension?
- (2) Is the existence of hypertension a sufficient reason for terminating the pregnancy?
- (3) Will the hypertension influence the health of the child?

In a series of 3000 patients delivered consecutively in the Hospital of the University of Pennsylvania, there were 115 women who showed essential hypertension, as indicated by the fact that their blood pressures were 140/90 or higher on 2 or more prenatal visits. On the first visit 60 of the 115 patients had a normal blood pressure but later developed essential hypertension, while 55 women exhibited hypertension on their first visit. Of the latter group 38 had had 1 or more previous pregnancies, the remaining 17 were pregnant for the first time. Of the 79 parous patients 43 had hypertension prior to the present pregnancy, 14 were normal on their first prenatal visit, and 18 had no previous record. Four patients had suffered from previous pre-eclampsia with a resultant increase in blood pressure early in this pregnancy, but with no recurrence of pre-eclampsia or eclampsia.

During the prenatal course 52 of the 115 patients experienced albuminuria of varying degrees. The remaining 63 were free of albumin. Two women showed impaired renal function as pregnancy progressed; 6 had only slight involvement

as shown by lowered urea clearance tests. The eyegrounds of 33 patients were examined and 21 were found to have early sclerotic changes with some spasm; 2 showed marked arteriosclerosis and 10 were normal. One patient had an abruption of the placenta in the eighth month of pregnancy. Eight patients experienced blood pressures of at least 200/100 at some time during their pregnancies. Four of these individuals had their pregnancies interrupted either by therapeutic abortion or hysterotomy. The remaining 4 delivered normal infants at term. Eleven patients had blood pressures between 190/100 and 200/100. Of these 9 delivered normal infants, 1 aborted and 1 delivered a stillborn child.

Of 2885 pregnancies not associated with essential hypertension 25 per cent ended in either abortion, premature birth, stillbirth or neonatal death, but of the 115 pregnancies in patients with essential hypertension 17 per cent ended in this manner. There were no maternal deaths in the 115 hypertensive patients studied in this series and of 90 women checked at the 6 weeks follow-up examination one-half showed a return of blood pressure to normal.

The authors believed that the presence of a high blood pressure in a pregnant patient who shows normal laboratory findings but who may have some albuminuria, edema or headaches should not contraindicate the carrying of such a pregnancy to term. A few additional precautions such as bed rest, control of the patient's weight and sedation are helpful. Any marked increase in the severity of the symptoms should be investigated for the possibility of an acute progression of the disease, although in the authors' experience this has been negligible. The patient should be informed that the possibility of fetal complications is no greater than in the absence of hypertension. Persons who are desirous of having 1 or 2 children should be told that, with adequate prenatal care, the possibilities of delivering a normal healthy baby are good and that there is little danger of any maternal accident. A permanent increase did occur in the hypertensive state in 45 of the 115 patients. This increase did not appear significant, and seemed in accord with the rise that would occur naturally in the course of the disease.

## PREGNANCY AND TUBERCULOSIS

### THE PRESENT STATUS OF THE PROBLEM

LOUIS I. FRIEDMAN AND JAMES R. GARBER

Amer. Rev. Tuberc., 54: 275-82, 1946

In women of child-bearing age one out of six deaths is due to tuberculosis, which is still the leading cause of death in women aged 15 to 44 years. About 32,000 pregnancies occur in tuberculous women annually but this is not considered a proof that pregnancy predisposes to tuberculosis,—only that the two conditions are frequently coexistent. The medical profession no longer believes,



as did physicians of earlier periods, that pregnancy cures tuberculosis or that pregnancy should never be advised or continued in a pregnant tuberculous woman. Studies have showed that pregnancy exerts little, if any, effect on the incidence or course of tuberculosis in these women.

A live birth is predicted in 81 per cent of these pregnancies, with a child normal in every respect. The child must be separated from the mother immediately to prevent infection; transplacental infection rarely occurs. That premature births are more common among tuberculous mothers has not been proved.

Therapeutic abortion should never be performed after the first trimester of pregnancy and rarely, if at all, during the earlier months of gestation. Even in advancing caseous-pneumonic disease, therapeutic abortion is of doubtful benefit. It is best to treat the tuberculosis as though no pregnancy existed. Collapse therapy is advised if successful collapse can be obtained before delivery is due. One of the authors reported delivery of live normal children by two tuberculous women after bilateral pneumothorax therapy. Tuberculosis, however, is best treated before marriage if recognized early.

Mass fluoroscopic or other roentgen examination of all females past puberty at regular scheduled intervals is recommended, particularly of those of the lower socio-economic groups. It has been estimated that 80 per cent of the cases will be in advanced stages when reported after physical examination alone; therefore x-ray examination of the chest should be done as routinely as Wassermann tests in prenatal clinics.

The success of therapeutic measures is proportional to the nature and extent of the lesions when treated. Collapse therapy does not affect pregnancy and may be life-saving. If during the last months of pregnancy the woman suffers dyspnea after each refill, the amount of air given at each treatment may be reduced and the frequency of treatments reduced. If there is a marked reduction in intrapleural pressure at the time of delivery, a refill may be required. Thoracoplasty during pregnancy carries a high risk for the mother and jeopardizes the life of the fetus.

Women with arrested tuberculosis should be allowed to marry unless the marriage will entail more physical effort than the patient can endure. A one to three year period has been variously advised before pregnancy is attempted; two or three births may be permitted but rarely more.

Delivery should be from below, but some steps such as episiotomy and/or low forceps should be taken to speed the second stage of labor. Version and extraction should be avoided because of the deep anesthesia required. Cesarean section may be utilized but it is by no means the procedure of choice unless some obstetrical indication for abdominal intervention exists. The type of anesthesia selected for these cases depends on the type of delivery and individual preference. Ether, ethylene, nitrous oxide, cyclopropane, spinal and local anesthesia all have their advocates. Following delivery, of course, the newborn should not be permitted to come in contact with the mother—which means that lactation should never be permitted.

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LOUIS I. FRIEDMAN AND JAMES R. GARBER

Amer. Rev. Tuberc., 54: 275-82, 1946

In women of child-bearing age one out of six deaths is due to tuberculosis, which is still the leading cause of death in women aged 15 to 44 years. About 32,000 pregnancies occur in tuberculous women annually but this is not considered a proof that pregnancy predisposes to tuberculosis,—only that the two conditions are frequently coexistent. The medical profession no longer believes,

from control by the anterior lobe during pregnancy and delivery. Some writers recommend treatment during pregnancy by administration of posterior pituitary powder in a nasal aspiration or injection of extracts. But the authors deem it more prudent to suspend all pituitary therapy for diabetes insipidus in this period because of the possibility of oxytocic activity.

## PYELITIS IN PREGNANCY

W. D. CLARK

California Med., 65: 21-26, 1946

Pressure from the pregnant uterus together with endocrine changes are presented as the causative agents for the physiological changes of the urinary tract in pregnancy; namely, loss of ureteral muscle tone, diminished ureteral peristalsis, ureteral dilatation and hydronephrosis with the resultant stasis of the upper urinary tract. Pre-existing urinary tract disease or congenital malformations enhance the possibility of a urinary tract infection during pregnancy. Symptoms, laboratory findings, bacteriological, x-ray and pathological findings of pyelitis are presented.

The most important point in treatment of pyelitis is prophylaxis. To prevent infections, a careful past history of urinary tract disease is necessary. If any history of disease is obtained a thorough urinary tract study with x-rays, cystoscopy, urograms, cultures, and smears must be taken. If a chronic urinary tract infection is found, treatment with sulfonamides or with penicillin should be instituted if the organism is found to be penicillin sensitive. Ambulatory treatment is usually satisfactory. If this fails, the patient is hospitalized and treated with penicillin or sulfonamides and sodium bicarbonate with emphasis on maintaining a urinary output of 1200-1500 cc. per 24 hours. If the infection is present during labor the therapy should be continued through delivery and into the puerperium. The author suggests caudal analgesia as the method of choice because of the increased relaxation of the soft tissues making for less trauma to the bladder. Postpartum distention should be combatted with 0.5 per cent mercurochrome instillation or furmethide (a new drug which increases bladder tone)—a retention catheter should be used only as a last resort.

The following factors should be considered before a pregnancy is interrupted: (1) the infection has failed to respond to adequate therapy; (2) renal damage is anticipated due to chronic recurring infections; (3) there is impaired renal function as shown by the usual tests; (4) duration of the pregnancy. If the pregnancy is terminated, the necessity for sterilization is determined by the evidence of severe renal damage and impaired function.

Sequelae to pyelitis of pregnancy prior to penicillin and sulfonamides were bacteriuria, pyuria, hydroureter, hydronephrosis, ureteral stricture with resultant urinary stasis. As yet there is insufficient data to indicate if these sequelae

From the foregoing discussion of this problem, it is apparent that the major responsibility in pregnancy complicating pulmonary tuberculosis rests with the phthysiologist and not with the obstetrician. However, to assure successful results, it is necessary for the phthysiologist and obstetrician to manage each case in a spirit of unprejudiced and whole-hearted co-operation.

(Based on 47 carefully chosen articles and written by a phthysiologist and an obstetrician, this paper is a well balanced and well documented review of a difficult problem.—Ed.)

## DIABETES INSIPIDUS WITH PREGNANCY

EDUARDO M. BALDI AND JUAN DIXON

An. Inst. Matern. y Asist. Soc., 7: 41-45, 1946.

Diabetes insipidus concomitant with pregnancy is a rare occurrence. The case described is that of a 21 year old woman, with otherwise negative history, who since her earliest recollection had suffered unusual thirst. At 17, without apparent cause this thirst became immensely exaggerated to the point where she required 10 to 12 liters of liquids daily. This was accompanied by an equivalent polyuria. There were no other physical symptoms. Her case was diagnosed as diabetes insipidus, pituitary injections were prescribed, and she improved slightly. She married, and a year and a half later she came to the hospital because of an amenorrhea. This was found natural since she was two months pregnant. All other indications were normal except the continuation of her excessive thirst and a polyuria of 12 to 14 liters daily. Laboratory findings were all negative except for a positive Friedman. Her regular doses of pituitary were discontinued for fear of provoking inopportune contractions of the uterus. She was required to report regularly throughout the pregnancy, during which her general condition remained stationary. She was delivered of a healthy child without incident. The diuresis diminished to 6 liters during the first days after delivery, but within 10 days had reverted to the habitual 12 liters.

Diabetes insipidus with pregnancy has been recorded in 4 variations: appearing during gestation in transitory form; existing before pregnancy and being aggravated by this; or disappearing to reappear after parturition; or being unaltered by gestation. The temporary type is more frequently found, and the type in our case is the least common.

There is no agreement among authors as to the cause of diabetes insipidus in pregnancy, since a variety of cases contradict any theory. However, a woman with a high renal threshold for excretion of salts may be predisposed to polyuria during gestation. Restricted or selective diets which require ingestion of greater quantities of water also create a temporary polyuria. It is probable that the oxytocic and antidiuretic hormones of the posterior hypophysis are dissociated

from control by the anterior lobe during pregnancy and delivery. Some writers recommend treatment during pregnancy by administration of posterior pituitary powder in a nasal aspiration or injection of extracts. But the authors deem it more prudent to suspend all pituitary therapy for diabetes insipidus in this period because of the possibility of oxytocic activity.

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Sequelae to pyelitis of pregnancy prior to penicillin and sulfonamides were bacteriuria, pyuria, hydroureter, hydronephrosis, ureteral stricture with resultant urinary stasis. As yet there is insufficient data to indicate if these sequelae

have been reduced by the newer drugs. Anyone with urinary tract infections of any consequence during pregnancy should have a complete urinary tract examination and evaluation before undertaking further pregnancies.

## A CLINICAL EVALUATION OF ECTOPIC PREGNANCY

A. A. MARCHETTI, K. KUDER AND A. KUDER

*Am. J. Obst. & Gynec.*, 52: 544-555, 1946

In this presentation an attempt was made to evaluate and comment upon the facts which have accumulated from the authors' experience with ectopic pregnancy in the Woman's Clinic of the New York Hospital from September 1, 1932 to January 1, 1946. During this period 41,365 pregnancies including 38,356 full term and premature deliveries, 3009 abortions, were cared for and in the same period 141 ectopic pregnancies, an incidence of 0.34 per cent or 1 in 293 pregnancies occurred. The ectopic pregnancies occurred most frequently in the age group from 25 to 35 years with the youngest patient 19 years of age and the oldest 41 years of age. One-fourth of the cases occurred in women beyond 35 years of age and it is significant that in this group late marriage, low fertility, and repeated abortions were factors often encountered in the histories. The study showed that 28.4 per cent of the patients had never before been pregnant and that 43.3 per cent had never previously been delivered of a viable infant. Furthermore, only 10.6 per cent had borne two or more children. Repeated ectopic gestation was noted in 7 patients or 4.9 per cent and in only 1 of these cases was there a previous history of salpingitis eventually verified by pathologic sections. The authors feel that chemotherapy and administration of penicillin will undoubtedly greatly alter the part that gonorrhea and pyogenic infections in general play in the etiology of ectopic pregnancy.

One death was reported in this series, an incidence of 0.71 per cent. This case apparently died of kidney shut down caused by incompatible Rh blood.

Of the 141 cases of pathologically proved ectopic gestation, the diagnosis was made preoperatively in 124 cases (87.8 per cent). In a total of 219 patients in whom a diagnosis of ectopic pregnancy was entertained the condition was found in 124 instances (56.6 per cent). About one-fourth of the patients (24.1 per cent) were operated upon shortly after admission, 51.8 per cent within the first 24 hours and 70.2 per cent within the first 48 hours after admission.

A total of 60 patients (42.6 per cent) received blood transfusions, 50 (35.5 per cent) preoperatively and during operation, and 10, (7.1 per cent) only after operation.

The greatest number of cases (53.2 per cent) ended as tubal abortions and 24.1 per cent terminated as tubal ruptures. In this series 94.3 per cent of the ectopic pregnancies were tubal, 3.6 per cent interstitial, 1.4 per cent secondary

abdominal, and 0.7 per cent intraligamentary. An attempt to evaluate the number of cases that terminated as internal ruptures of the pseudocapsularis revealed that 16.3 per cent could be so classified.

## MANAGEMENT OF PLACENTA PREVIA AT THE CHICAGO LYING-IN HOSPITAL

A REVIEW OF 325 CASES DURING 1931 TO 1945

M. EDWARD DAVIS AND ALICE CAMPBELL

Surg., Gynec. & Obst., 83: 777-88, 1946

Mortality from placenta previa has greatly decreased with early diagnosis, hospitalization, rational obstetrical care and general use of blood and plasma transfusions. It is estimated that 15 to 20 per cent of maternal deaths result from placenta previa. Failure in the mechanism of transportation of the fertilized ovum is suggested as the possible cause of this disease. The ovum attaches itself to the location where it is when fertilization occurs, and the degree of placenta previa is dependent upon how close it is to the internal os when implanted.

Placenta previa occurred in 0.79 per cent of 40,961 patients delivered in this hospital. Three out of 4 patients were multigravidas. The painless bleeding in the later weeks of pregnancy is considered pathognomonic of placenta previa, but in 39 patients (12 per cent) in this series, initial bleeding occurred before the twenty-eighth week; in 53 (16 per cent) between the twenty-eighth and thirty-second week, that is, before fetal viability. The onset of effacement of the cervix and uterine mobility, rather than the degree of placental coverage of the internal os, determine the onset of bleeding and the extent of previa; whether labor has begun determines the severity of the bleeding. Onset of labor causes the hemorrhage to increase or to recur if it has subsided. A profuse hemorrhage occurred in 35 patients before examination and initial treatment; 8 entered the hospital in shock.

Evidence of bleeding should be followed by vaginal examination to determine the degree of placenta previa, condition of the cervix, adequacy of the pelvis and the fetal position. In 33 patients no placental tissue was palpated at first but on return to the hospital following painless bleeding, the placenta was easily palpated.

Treatment of this condition includes careful blood study as to hemoglobin content, cell volume, Rh reaction and Wassermann or Kahn tests. If after iron therapy the hemoglobin remains under 10 grams, transfusion is indicated or suitable blood should be in readiness for use at the time of delivery. Condition of the cervix should be determined and the presence of the placenta over the os noted. Termination of pregnancy is indicated when a diagnosis of placenta previa has been determined.

In this series rupture of the membranes controlled bleeding in 98 cases; some additional treatment was required in 99 other cases. Cesarean section was necessary in the remaining cases. Abdominal delivery is used in incomplete placenta previa if there has been serious blood loss, if the patient is an elderly primipara desiring offspring, and in patients with an inadequate pelvis. Low or cervical cesarian section (laparotrachelotomy) is the operation of choice. In incomplete placenta previa in which rupture of the membranes does not control bleeding, Willett's method is used.

Cesarean-hysterectomy is used only in patients admitted when obviously or possibly infected. Abdominal delivery was used in 143 (44 per cent) of the patients in this series; 93 were delivered naturally; 89 had some operative procedure. Old procedures such as Water's method, tamponade, use of the bag (colpeurynter), introduction of a foreign body close to the placental site, or the Braxton Hicks, are no longer advocated.

Administration of ergonovine thirty seconds before delivery of the infant is important. The placenta should be removed if separation is delayed. Exploration may be necessary if bleeding continues after the placenta is out of the uterus. Manual removal of the placenta was required in 36 of these cases; uterine tamponade to control bleeding in 15 patients; hysterectomy was necessary in 5 patients because of continued bleeding. At least one transfusion was required in 139 patients (40.3 per cent); 21 patients had two or more transfusions. Parenteral fluid should be used only in conjunction with blood, not instead of it.

Maternal mortality was 0.6 per cent; 225 of 329 infants (68.4 per cent) lived. Prematurity was the most important cause of death of the infants.

## PREGNANCY AND DELIVERY IN A UTERUS WITH A DEFECTIVE CICATRICE FROM HYSTEROTOMY

E. VALENZUELA, ET AL.

Bol. Soc. Chile. Obs. y Gin., 11: 3-6, 1946

Two cases are reported of patients who had scars from earlier caesarean delivery, and in each of whom a succeeding pregnancy progressed uneventfully to the time of delivery. At that time the defective cicatrice caused slow initiation of labor and intense pain, but no general complications.

The first case had had a classical caesarean in September 1944 because of placenta praevia. Her recovery was normal. In October of the following year she came to term in her second pregnancy and was admitted to the hospital after 30 hours of intense pain and after experiencing the cessation of fetal movements. Examination showed a patient in excessive abdominal pain allowing only superficial palpation of the fetal parts. Absence of movements was verified and manual palpation disclosed a long resistant cervix, 1 fingerbreadth dilated, directed almost vertically against the back of the pubis, preventing the



advance of the fetal pole. In surprising contrast to these findings, her general condition was satisfactory and pressure and pulse entirely normal.

Although there were no ominous symptoms the authors decided to intervene. On opening the peritoneum they found the fetal sac intact, free in the peritoneum. Extracting this, the uterus appeared fully opened and with the edges of the earlier incision rigid and everted for almost the total length of the uterus. The amount of free blood present was minimal, and there was no hemorrhage along the borders of the dehiscence. Because of the size of this latter and its rigidity, making a repair impossible, they performed a sub-total hysterectomy. Post operative recovery was normal. Histological examination confirmed the macroscopic observation that rupture of the cicatrice was not sudden and due to parturition, but that the cicatrice was defectively healed and slowly separated during gestation, only the integrity of the peritoneum being preserved.

The second case was a woman whose two previous deliveries had necessitated low cervical caesarean sections because of a narrow pelvis. She had normal recoveries. At term with her third pregnancy she appeared with membranes ruptured, spontaneous pain absent, but sensitive to palpation. On laparotomy the authors found the uterus very hard, with Bandl's ring contracted. They incised the lower segment transversely and extracted the fetus by version. The Bandl ring made extraction of the head difficult. The child was alive and in good condition. The inferior segment of the uterus had been converted into a peritoneal bag without muscular coat, and the body of the uterus was connected with the cervix only by a pedicle 3 to 4 cm. wide. Since there was no hemorrhage, no large vessel being involved, they decided on repair, and sutured the edges of the separated scar. The patient made a satisfactory recovery.

It is difficult to decide if these cases were due to sudden rupture of the old cicatrice at the onset of labor, or to a dehiscence developing slowly during the distention of the uterus. The authors incline toward the latter view.

### SPONTANEOUS RUPTURE OF 5-MONTHS' PREGNANT UTERUS DUE TO CONSERVATIVE SUBTOTAL HYSTERECTOMY SCAR

HORACIO L. MAZZA

Boletín de la Sociedad de Obstetricia y Ginecología  
de Buenos Aires, 25: 82-89, 1946

This concerns a 36 year old patient who had had 3 previous pregnancies followed by normal deliveries, the last of which had occurred 14 years previously. She was operated upon in 1939 for uterine fibromyoma when a fundal hysterectomy was done. The latter was followed by metrorrhagia and later by amenorrhea accompanied by nausea, vomiting and pain persisting for 5 months.

In this series rupture of the membranes controlled bleeding in 98 cases; some additional treatment was required in 99 other cases. Cesarean section was necessary in the remaining cases. Abdominal delivery is used in incomplete placenta previa if there has been serious blood loss, if the patient is an elderly primipara desiring offspring, and in patients with an inadequate pelvis. Low or cervical cesarian section (laparotrachelotomy) is the operation of choice. In incomplete placenta previa in which rupture of the membranes does not control bleeding, Willett's method is used.

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ligation and lumbar sympathetic block. The patient died on the thirtieth hospital day of septicemia. At autopsy the anterior pituitary lobe was about 85 per cent necrotic.

The exact mechanism whereby pituitary necrosis is produced is unknown. The contributing factors are: (1) hyperplasia of the pituitary during pregnancy; (2) the rigid bony cage enclosing the gland and resisting hypertrophy; (3) sinusoidal arrangement of the blood vessels in the parenchyma. The initiating mechanism begins with collapse from shock or hemorrhage at delivery with resultant infarction of the gland.

In handling these cases the authors emphasized prophylaxis and early diagnosis. Early treatment is directed toward relieving shock, replacing blood, and correction of the obstetric situation which precipitated shock. Blood chemistry should be studied early and frequently and hypoglycemia prevented. Late treatment is replacement in essence. (1) The use of pituitary extracts is rational but not very potent. (2) Glucose is invaluable. (3) Administration of adrenal extracts with potassium restriction and sodium administration is recommended. (4) Thyroid may make some patients worse by causing sudden adrenal cortical failure. (5) The occurrence of another pregnancy may result in a clinical cure or marked remission.

The diagnosis of pregnancy was established. With the development of a picture of an acute abdomen and symptoms of internal hemorrhage, a diagnosis of ruptured pregnant uterus or ectopic pregnancy was made, and a laparotomy was performed. The whole fetal sac was found surrounded by intestinal loops and was adherent, through the placenta, to a rupture located in the fundus of the uterus, in connection with a scar. The entire sac was removed and a subtotal hysterectomy with preservation of the adnexa was performed, followed by uneventful recovery. Pathologic examination showed implantation of the placenta on the fibrotic surgical scar and the endometrium, with thin noninvading chorionic villi.

In this case certainly the thinning and inextensibility of the uterine walls at the level of the surgical scar during the development of pregnancy explain the spontaneous rupture of the organ 5 years following a conservative hysterectomy.

Such an event is undoubtedly rare and, therefore, conservative measures ought to continue to prevail in gynecologic surgery, even though such accidents are apt to occur.

## ACUTE POSTPARTUM NECROSIS OF THE ANTERIOR HYPOPHYSIS

E. W. NELSON AND J. P. MICHAELS

*Am. J. Obst. & Gynec.*, 52: 817-825, 1946

This is a detailed report of a case of acute postpartum necrosis of the anterior hypophysis, wherein the patient exhibited spontaneous hypoglycemia of a severe degree and survived the acute episode long enough to display some of the manifestations of Simmonds disease.

A close relationship has been shown to exist between postpartum necrosis, shock and hemorrhage at delivery. A thorough search of the literature reveals 595 cases suggestive of Simmonds disease in one form or another.

This patient was a 32 year old white para 0 near term who was admitted to Charity Hospital with eclampsia. She fell spontaneously into labor and was delivered by low forceps on the following day. Blood loss at delivery was estimated at 400 cc. The blood pressure fell from 150/100 to 78/50 following delivery. This shock was treated with blood, plasma and adrenalin, but did not respond for about 9 hours. On the seventh hospital day she fell into hypoglycemia and was successfully treated with 50 per cent glucose. On the ninth day the patient became comatose and a diagnosis of necrosis of the anterior pituitary was made. Antuitrin, desoxycorticosterone acetate and sodium chloride were given. It was noted that lactation never occurred, that the B.M.R. was -13, and that a brownish pigmentation of the skin was increasing. On the seventeenth day she developed a right thrombophlebitis and was treated by

oxytocic medication. Second, quinine-calcium has been proved satisfactory for a number of reasons: the regularity and constancy of its oxytocic action; the synergism between quinine and calcium, shown by the smaller dose required; the fact that it is non-toxic and well tolerated in the doses used; and the physiologic character of its action which does not extend to irreversible hypertonic contractions. The procedure followed after careful diagnosis is to rupture the membranes, having previously loosened the inferior pole in case of adherence, and immediately institute quinine-calcium medication to hasten the birth. Experience has indicated a dose of 10 to 15 cc. injected intramuscularly, which usually gives immediate response in increased contractions. Delivery usually results in one-half to one hour. Occasionally a second dose must be given in one-half, one or two hours. In such cases an antispasmodic may be necessary, and morphine intravenously or atropine subcutaneously is added. The interaction of morphine seems to promote dilatation.

Details of 61 cases are given along with a tabulation of the salient points of diagnosis and treatment. There were 18 primiparas, 17 secundiparas and 26 multiparas. Ages ranged widely, those of the primiparas varying from 15 to 36 years. Dilatation at the beginning of treatment was 2 cms., 12 per cent, 2 to 4 cms., 20 per cent, over 4 cms., 8 per cent. Those over 5 cms. are not listed. Time of inertia before treatment ranged from 14 to 144 hours, averaging 41 hours 12 minutes. From initiation of treatment to complete dilatation averaged 3 hours 28 minutes; it ranged less than 1 hour in 9 cases; 1 to 2 hours in 19; 2 to 3 hours in 11; and 3 to 4 hours in 9 cases. Quinine hydrochloride and calcium gluconate were used, averaging 0.19 grams quinine base to each 5 cc. Dosage ranged from 0.2 grams base to 1.8 grams, averaging 0.72 grams. This provoked spontaneous birth in 53 cases (87 per cent). The other 8 had to have: manual dilatation 2, forceps 5, internal version 3. Four of the forceps cases were primiparas. Fifty per cent of infants gave signs of injury before treatment was begun. Their condition at birth was: crying 36, slight blue asphyxia 17, severe blue asphyxia 5, pallid asphyxia 1, stillbirths 2 (obstetrical injury). Two others died later, one as result of difficult version and one with intestinal hernia. The others were in good condition. Fifty-eight cases had spontaneous expulsion of placenta, the other three had to have intervention. Two had endometritis. The others recovered without incident.

Prolonged labor due to inertia is relatively frequent. Since physiopathologically the condition is due to lack of proper stimulation of the cervix, the use of oxytocics is recommended but must be preceded by artificial rupture of the bag. Quinine-calcium stimulates the proper rhythmic acceleration of contractions and is safe, rapid and non-toxic. Added advantage is its facile interaction with morphine and antispasmodics in general, which permits regulation of effect.

(Despite its frequency uterine inertia is seldom discussed in our North American periodicals and hence this thoughtful consideration of the subject by Valenzuela Saez of Santiago, Chile is especially welcome. The results he reports in his 61 cases speak well for his management of these patients. This is especially true when it is noted that the average

# PATHOLOGY OF LABOR AND PUERPERIUM

## PRIMARY UTERINE INERTIA

EDUARDO VALENZUELA SAEZ

Bol. Soc. Chile. Obs. y Gin., 11: 73-, 1946

Numerous publications refer to the dangers which accrue from hastening delivery by medication: rupture, infection, tetany, etc. Slow labor from weak and infrequent contractions has had scant attention despite the fact that this sort of labor often presents complications which should not be underestimated.

This type of parturition is manifested by uterine, cervical and fetal signs. The uterus has primary inertia as evidenced by contractions of slight intensity and duration. There is little pain, and palpation shows less tension than customary for normal labor. There are occasional severe pains, but not at regular intervals. The cervix presents none of the usual characteristics. It is partly or completely obliterated, usually thick and soft, sometimes resistant at the level of the internal orifice. Dilatation ranges between 2 and 4 centimeters, with slight variation over several days. Some authors report that the fetus shows no important manifestations. In the author's observations of 61 cases he noted alteration in the fetal heart sounds in 18, presence of meconium in the amniotic fluid in 20, and coexistence of both signs in 9 cases. In these cases the bag of waters is flaccid and lacks proper tension, exerting no pressure on the mechanism for dilating the cervix. Labor in primiparas usually has to be terminated by forceps. In multiparas there are more spontaneous deliveries and frequently a mode of dilatation called "terminal sub-complete," in which the cervix does not disappear but remains thick, soft and totally relaxed. It is such types of labor which force the use of forceps, internal version or artificial dilatation, and which contribute greatly to maternal trauma and a high fetal morbimortality.

Early diagnosis of this syndrome is most important. Flaccidity of membranes during contractions suggests a prolonged labor, especially if the head is high and there is concomitant inertia. Medical treatment includes use of quinine-calcium, quinine and sodium salicylate, to stimulate and accelerate contractions. Better results are obtained after spontaneous rupture of membranes. Artificial rupture of membranes alone will often stimulate contractions and overcome inertia. The whole anomaly may be explained as follows: first, absence of a well shaped bag of waters creates failure of nervous and mechanical stimulation of the cervix; second, inertia, lack of uterine activity capable of bringing about descent, fails to supply adequate cervical stimulation.

With this conception of the syndrome its treatment offers a double approach: first, rupture of the membranes which form an obstacle to the excitomotor mechanism; this procedure also favors the reaction of the uterus to adequate

activity. When not present in adequate amounts the uterine musculature is inactive or depressed, and is refractory to the common oxytocics. In sum, this study confirmed fully Bell's earlier contentions.

But to clinicians the later observations of Patton and Mussey will probably prove more impressive than the experimental studies mentioned above. These authors (*Am. Jour. Obstet. & Gynec.*, 41: 948, 1941) administered solutions of calcium gluconate intravenously to 26 patients in labor. The dosage ranged from 10 cc of a 10 per cent solution to 20 cc of a 20 per cent solution; it was given very slowly, 4 cc of the former solution per minute being considered to be the maximum rate at which the solution could be administered with avoidance of unpleasant side reactions. On the basis of their observations the authors concluded that the administration of calcium will increase the intensity of uterine contractions and will decrease the interval between contractions but will not increase the duration of contractions. They found it most useful in cases of inertia in the first or second stages of labor. They emphasize the fact, of course, that it should not be given to patients who have already had or are likely to need a drug of the digitalis group.

It is quite possible that the success which Valenzuela Saez met in his treatment of uterine inertia was due to the calcium administered rather than to the quinine; it is also conceivable that the calcium may have sensitized the uterus to quinine just as Danforth and Ivy found that it sensitized the uterus to pituitary extract and other oxytocics. In any event here is further evidence to suggest that calcium gluconate deserves more trial in uterine inertia than it has had. This statement is made despite the fact that my own experience with this drug in a very few cases has not been encouraging. However, in prolonged, stubborn cases of uterine inertia, we are usually glad to grasp at almost any straw provided it does not put us in a worse position than we are already in. And at least calcium gluconate seems to be a safe measure.

The third agent recommended by the author, morphine, needs continual re-emphasis. Every obstetrician will recall cases in which he ordered morphine in order to give the patient (and himself) some rest only to find that forthwith the cervix dilated rapidly and delivery ensued promptly.—Ed.)

## CONSTRICTION RING DYSTOCIA

M. P. RUCKER

*Am. J. Obst. & Gynec.*, 52: 984-992, 1946

The author differentiates between a constriction ring and Bandl's ring. The latter is an anatomic concept and is located at the junction of the active contractile portion of the uterus with the lower uterine segment. Bandl's ring ascends in obstructed labor, and the lower uterine segment becomes thinner and may rupture. A constriction ring does not rise but remains fixed to the fetus, and spontaneous uterine rupture does not occur. A constriction ring may be reversible or irreversible.

The present paper contains a discussion of 202 cases of constriction ring dystocia seen by the writer in the past 43 years. These occurred in 13,575 term and near term deliveries. The last 182 cases, which the author was particularly on the lookout for, occurred in 10,838 deliveries, representing an incidence of 1.67 per cent. There is a general impression that the condition is rarer than the

duration of labor prior to the institution of treatment was 41 hours while the average duration after the beginning of therapy was only  $3\frac{1}{2}$  hours. The agents which he found most valuable were: artificial rupture of the membranes; quinine in combination with calcium; and morphine.

There can be no doubt that artificial rupture of the membranes is a most efficacious procedure in uterine inertia provided that certain conditions are met. In the first place, evidence must be at hand that the patient is actually in labor and not in false or prodromal labor. The only dependable evidence of true labor is progressive cervical dilatation; and, by and large, the results of artificial rupture of the membranes will be much better if it is not done until the cervix is 4 or more cm. dilated. In the second place, the procedure is more likely to be successful if there is some bag of waters in advance of the presenting part. The puncturing of this bag not only allows the presenting part to press more effectively against the lower uterine segment and cervix, but permits the release of a larger quantity of fluid than in cases in which the membranes are closely applied to the presenting part. Thirdly, the presentation must be vertex and the case must not be one of multiple pregnancy. Not only is prolapse of the cord more likely to occur in breeches (particularly footling) and in twins, but experience has shown that the procedure is less efficacious in these conditions. Finally, the membranes must be stripped well back from the lower uterine segment before they are punctured. In a series of convincing studies Stieve has shown that loosening of the membranes from their filamentous attachment to the lower uterine segment is a regular accompaniment of early labor and is prerequisite to successful cervical dilatation; and it seems reasonable to believe that the lower uterine segment retracts more efficiently if it is free to slide back and forth easily over the membranes and presenting part. It is well known, furthermore, that simple digital stripping of the membranes in gravidæ near term often suffices to initiate labor and almost always promotes cervical effacement and dilatation.

The second therapeutic measure recommended in the above paper, quinine and calcium, will be regarded with skepticism by most American obstetricians,—especially in respect to the quinine. Most of us will recall the days when quinine with castor oil was the orthodox method for inducing labor,—or rather for *trying* to induce labor, because it usually failed. And on the basis of this experience plus many failures and few successes with this drug as an oxytocic during labor, opinion is rather general in this country that quinine is of no value whatsoever in the treatment of uterine inertia. If statistical evidence is needed to support this consensus, and it scarcely is, the clear-cut study of Marchetti, Kuder and Fitch may be recalled. These authors studied the effect of the antepartum administration of small doses of quinine in 500 cases and compared them with a similar number of controls. Quinine did not shorten the duration of labor; on the contrary, in primigravidae it was lengthened; nor did the drug appear to make labor easier. (New York State J. Med., 43: 2183, 1943.)

While the case against quinine in uterine inertia is thus rather strong, the same cannot be said about calcium. In fact, there is a host of experimental evidence and some little clinical experience indicating that calcium gluconate deserves more trial than it has had in this complication of labor. The story of the oxytocic action of calcium goes back to the days of Blair Bell who, it may be recalled, also introduced pituitary extract into obstetrics. In 1909 Blair Bell and Hick reported in vivo experiments in which the administration of calcium as  $\text{CaCl}_2$  caused marked contractions of the uterus of the pithed rabbit (Brit. M. J., 1: 777, 1909). Six years later, on the basis of this and other evidence, Blair Bell reached the conclusion that a reduction of the calcium content of the blood below an optimum level might be a factor in the causation of primary uterine inertia and advised the administration of calcium during the last trimester of pregnancy as a prophylactic against uterine inertia (Proc. Roy. Soc. Med. 8: 71, 1915). During the intervening years a number of articles have appeared on this subject, some confirming and some contradicting the observations of Bell. One of the most carefully executed of these studies was that of Danforth and Ivy (Am. J. Obstet. & Gynec., 37: 194, 1939). These authors showed that in the post-partum uterus of the dog and rabbit, calcium plays an essential role in motor



from the attitude that once the cervix begins to dilate progress should be definite and sustained. When the progress of labor as determined by sterile pelvic examination first deteriorates posterior pituitary extract should be utilized to stimulate labor. If no effective uterine contractions or progress has been obtained after one to four minim doses have been used, covering a period of 1 to 3 hours, it is reasonable to discontinue the drug and turn to other means of completing labor.

This second policy in handling cases of prolonged labor using posterior pituitary extract at the Boston Lying-In was formulated from a review of 1609 cases given posterior pituitary extract. This series comprised 767 private patients and 842 clinic cases and was further subdivided into complicated (labors over 20 hours) and uncomplicated groups of uterine inertia.

The results of this study are tabulated in a number of charts. It is clearly shown that age and parity go hand in hand; two-thirds of the cases were primiparas and two-thirds were under 30 years of age.

About 3 per cent of the complicated clinic group were classified as "dangerous multiparas," those having definite or borderline cephalopelvic disproportion.

The station of the head at the onset of labor was not a factor in the production of prolonged labor.

The overall average of the first stage of labor in the uncomplicated group fell between 6 and 8 hours. In the complicated group (90 per cent) the first stage was about 30 hours' duration. The length of the second stage in the complicated and uncomplicated groups showed a marked contrast, in that clinic patients were subjected to many more hours of labor. The explanation was threefold. When responsibility is dependent upon one person (private cases) the tendency is for a shortened second stage; an increased amount of pituitrin was used in the private series; and an attempt was made to reduce the midforceps deliveries by allowing the head to descend to the perineum for easy outlet forceps.

There was a higher incidence of midforceps operations in the private series and a low incidence of cesarean section. It was just the opposite in the clinic patients.

A much larger single dose of pituitrin was used in the private series as well as a greater total amount of drug per given labor. It was also administered earlier in labor in the private series.

The fetal mortality (stillbirth and neonatal deaths) in this series has been corrected for premature infants, congenital defects, erythroblastosis, fetal death in utero at onset of labor, fetal death due to prolapse of the umbilical cord, premature separation, placenta previa, breech extraction, contracted pelvis, and difficult forceps not associated with prolonged labor.

The corrected irreducible fetal mortality in all the clinic patients during the past five years was 0.33 per cent. In the uncomplicated group there was a 0.69 per cent mortality in the private and 0.63 per cent in the clinic series. Complicated cases in the private series showed a corrected mortality of 4 per cent while the clinic series was 11.65 per cent. Intrauterine asphyxia was the most frequent cause of fetal death.

present figures would indicate. It is quite possible that many cases are overlooked.

The diagnosis is made with certainty upon feeling the ring with the hand in the uterus. The condition should be suspected when there is no apparent cause for failure of labor to progress in spite of hard "pains". Pains that persist after the palpable hardening of the uterus has passed off are suggestive, but not pathognomonic. If the cervix hangs loosely about the presenting part, the suspicion of the presence of a constriction ring is heightened. In the present series the ring was felt in 199 cases.

As to etiology, this series presented a somewhat unfavorable selection as obstetric risks—increased age, abnormal presentations and a larger number of borderline pelves—suggesting that the ring is a fatigue phenomenon, comparable to the spasms that occur in striated muscles in runners or swimmers.

Epinephrine was used to relax the constriction ring in 150 cases. It failed 8 times. Twenty cases occurred before it was known that epinephrine would relax the ring, and of these one mother and 9 babies were lost. One hundred and eighty-two mothers and 183 babies were seen after the advent of epinephrine. There was no maternal death, and the fetal mortality was 17.5 per cent. Epinephrine (1:1000) was administered subcutaneously in 5 to 8 minim doses. In 7 cases it was necessary to give a second injection. The action is prompt and should appear in from 3 to 5 minutes. The writer has found this to be the most reliable relaxing agent; results have improved as experience with this drug has grown.

(The figure reported by Rucker for the frequency of constriction rings, namely 1.67 per cent or 1 in 60 cases, is even higher than that cited by Herman W. Johnson who found 1 in 80 cases. If these authors are correct most of us are missing a huge number of these rings. But for full discussion of this moot question see editorial note on uterine rings in October, 1946 issue of Survey, pp. 649-654.—Ed.)

## THE TREATMENT OF PROLONGED LABOR WITH POSTERIOR PITUITARY EXTRACT

D. E. REID

*Am. J. Obst. & Gynec.*, 52:719-734, 1946

The problem of prolonged labor in the absence of cephalopelvic disproportion is one of the major problems in obstetrics and a single satisfactory method of treatment does not exist for this group of dystocia patients whose cervixes fail to dilate completely.

When x-ray pelvimetry has ruled out absolute disproportion in these cases of uterine inertia one of two courses of action is open. The first involves resting the patient at intervals and keeping her in positive fluid balance with the view that she will eventually deliver herself. The second course of action stems

All injections in these cases were made into the fourth lumbar interspace, employing 5 per cent solution of procaine. As for side effects, only 3 patients vomited and none complained of headache.

The author discusses the supposed dangers of spinal analgesia for delivery—vasomotor, circulatory, respiratory paralysis and possible toxic action. It is concluded that the effect of spinal block with procaine depends on the level of analgesia reached, and that the so-called "peculiar susceptibility of pregnant women" to spinal nerve block is without foundation, beyond the possibility of collapse due to comparatively rapid decrease of intra-abdominal pressure in cesarean section.

The benefit to the child, especially in prolonged and trial labors, is emphasized. Spinal analgesia avoids the combination of morphine narcosis with superimposed general inhalational anesthesia.

It is contended that spinal analgesia is of great value in preventing surgical shock in difficult deliveries after prolonged labor. The only contraindication, aside from skin sepsis and spinal deformity, is severe shock and hypotension, and once these are corrected (as they should be prior to operative intervention) spinal block will help prevent further deterioration of the general condition

## THE SELECTION OF FORCEPS FOR MIDPELVIC ARREST OF THE VERTEX

L. LANGMAN AND H. C. TAYLOR

*Am. J. Obst. & Gynec.*, 52: 773-782, 1946

In reviewing the 701 midforceps operations from 1934 to 1940 at Bellevue Hospital which occurred among 10,814 deliveries, the following factors influenced the selection of forceps for each case: 1. Experience. 2. Position of the occiput. With anterior positions classical forceps were used without exception. In transverse positions three-fourths were delivered with the Barton, while in the posteriors over 50 per cent were delivered with the Kiellands. 3. Type of pelvis. Since there is a tendency for transverse and occiput posterior positions to persist in android and anthropoid pelvises the Barton and Kiellands were used more often. Hence these two forceps were given more difficult tasks than the classical. 4. Size of baby. The Kielland forceps proved more unsuitable in the babies over 8 pounds, being slightly more common in the group in which it was used.

In this series the Barton forceps was used in 371 instances, the Kielland in 134 and some form of classical instrument in 196. It should be remembered that the results of forceps deliveries can be examined only in relation to the conditions under which they were performed. In this series of midpelvic forceps the maternal mortality was 0.56 per cent. Of the 4 deaths 2 were delivered by classical

The high fetal mortality rate in the clinic series represents the effect of prolonged labor on the infant. In clinic patients subjected to over 40 hours of labor (26) the fetal mortality was 29 per cent.

## SPINAL ANALGESIA FOR FORCEPS DELIVERY IN ABNORMAL LABOUR

A. F. ANDERSON

J. Obst. & Gynaec. Brit. Emp., 53: 347-361, 1946

Having seen both tragedies and near-tragedies, in which the maternal condition after abnormal delivery was worse than before, out of all proportion to the difficulty of delivery, the author is convinced that general inhalational anesthesia must be responsible for many avoidable fatalities. The frequency of failure to recognize prolonged general anesthesia as an important contributory factor in the production of shock is stressed, and an exhortation is made to eschew the term "obstetric shock", as being an escape diagnosis.

A series of 26 cases is presented, all of them selected difficult cases, in which spinal anesthesia was given and blood pressure readings taken throughout the duration of operative delivery. In 25 cases operative delivery was necessary because of inability of the mother to deliver herself owing to malposition of the fetus, disproportion, inertia and to prolongation of labor. Seventeen of the 25 patients had primary inertia. The one remaining case of the 26 had no obstetric difficulty, but had collapsed under chloroform outside the hospital just before delivery was attempted. Twenty-two patients were primigravidae; the average age was 31 years, 11 being over 33 years of age. The average weight of the infant was 8 pounds; 16 were over 8 pounds.

The average duration of labor was just over 60 hours; in 7 cases it was over 90 hours. Of the 14 cases of severe primary inertia, 3 infants died, a mortality of 21 per cent, and in none of these deaths could the anesthetic be held responsible. There were 2 maternal deaths, one from pulmonary embolism on the 17th postpartum day, and the second from streptococcal septicemia, contracted before admission. Forty-five per cent of the patients developed a pelvic infection, but only 22.5 per cent were severe enough to be morbid. Of the 14 true inertia-syndrome patients, 50 per cent developed pelvic infection, of whom only 21 per cent were morbid. Although some credit for keeping this figure down must go to the sulfonamides, many of the infections were due to sulfonamide-resistant organisms. It is stated that neither figures nor statistics can describe the well-being of women delivered under spinal block, as compared to the condition of those in whom prolonged labor is terminated under general anesthesia.

A few patients had a fall in systolic blood pressure level which in the presence of surgical shock or hemorrhage would have required instant treatment, yet in none of these were there any signs of shock or distress. The pulse-pressure was always at least 20 mm. Hg.

gynecoid, 8 as android, 9 as anthropoid and 3 were flat. In general it was thought that manipulative and accidental factors were the more important etiological agents in prolapse of the cord, e.g., premature rupture of the membranes, bagging or manual rotation of high heads, increased pressure incidental to struggling under anesthesia, and length of cord.

Fetal salvage was poor. The total babies who died were 28 (39 per cent), viable babies who died 23 (32 per cent). The degree of cervical dilatation at the time of prolapse is of major significance in fetal mortality. With the cervix fully dilated 36 live babies and 9 dead were obtained. In incomplete dilatation 7 live and 19 dead babies resulted. The time factor and ease of prompt delivery were the important factors in securing a living child. In some cases the baby's condition before treatment of the cord was so poor that no form of delivery would have helped.

There were two maternal deaths in the series following operative deliveries from below.

The conclusions and recommendations reached from this study were 4 in number. First, early recognition is important. This can be facilitated by prompt pelvic examination when the fetal heart indicates fetal distress. Second, prompt and appropriate obstetrical operation after full dilatation of the cervix. Third, improving results with incomplete cervical dilatation by: (a) taking the patient to the delivery room, placing her on the delivery table in the dorsal lithotomy and Trendelenburg position, anesthetizing her with oxygen-ether and then examining her under sterile conditions; (b) lift the presenting part out of the inlet to relieve pressure on the cord; (c) if the fetal heart is normal and the patient primiparous and the cervix 3 fingers dilated, a cesarean section should be done while the examiner continues to hold the presenting part out of the pelvis; (d) if the patient is multiparous and the cervix 3 F or more and the cord replaceable, use the dilating bag. Fourth, do not engage in major obstetric operations if the fetal heart has been badly compromised and does not improve with oxygen and elevation.

## THE FOURTH STAGE OF LABOR

### AN ACCOUNT OF THE PHYSIOLOGY AND CLINICAL ASPECTS OF THE POSTPARTUM UTERUS DURING THE FIRST POSTPLACENTAL HOUR

E. M. GREENBERG

Am. J. Obst. & Gynec., 52: 746-755, 1946

This paper in presenting for consideration the "fourth stage of labor" deals with postplacental hemorrhage and proposes to help combat it by recognizing the first postplacental hour as a separate and distinct phase of the process of labor. By so recognizing that hour as a physiologic entity having its own

forceps and 2 by the Barton. One death was ascribed to toxic gum acacia. Hence the corrected maternal mortality (puerperal sepsis) was 0.4 per cent. The entire maternal morbidity was 41.3 per cent. The cases delivered by classical forceps had a somewhat better record. In injuries to the birth canal comparisons were difficult. Three bladder injuries followed the use of Barton forceps. There were also more cases of cervical lacerations, sulcus tears and third degree lacerations with Bartons. The blood loss over 500 cc. was commoner after the use of Kiellands. The gross infant mortality for the entire series was 9.4 per cent, the death rate for the Kielland delivered babies being higher than for those handled by other types of forceps. The uncorrected fetal mortality was found to be 8.6 per cent for the classical forceps, 7.5 per cent for the Barton and 15.6 per cent for the Kiellands. Failure of forceps occurred in about 33 cases out of the 701 patients. Actually in 99, more than one type of forceps was employed to effect delivery. Most of the failures occurred with the classical forceps.

It is difficult if not impossible to compare the different types of instruments, techniques of application and end results in the midforceps operation problem, because of variation in the incidence of cesarean section, conduct of the second stage, and the different techniques of forceps application and delivery. A high incidence of cesarean section will be accompanied by a decreased frequency of forceps delivery with improved figures and vice versa. If the attitude toward the length of the second stage is one of supporting the patient, small doses of pituitrin in selected cases, a long second stage, the use of midforceps will vanish. If the midforceps operation is elected and an instrument selected which is especially adapted to the individual pelvis and particular position of the vertex, the results may be favorably compared. In this series the fetal mortality directly attributable to the forceps operation (intracranial injury) amounted to 5.2 per cent.

## PROLAPSE OF THE UMBILICAL CORD

S. B. GUSBERG

*Am. J. Obst. & Gynec.*, 52: 826-829, 1946

Seventy-one cases of this unfortunate accident of labor which occurred during the past 10 years were reviewed by the Sloane Hospital Group. Their incidence was approximately 0.42 per cent.

In analyzing the etiology of prolapse of the umbilical cord it was noted that parity did not play a significant role. There were 29 primiparas in the group. A preponderance of abnormal presentations were encountered. Vertex presented in 30 cases, breech 20, transverse 7, compound 1 and twins 13. The number of contracted pelvises was small in this series. 51 were classified as

gynecoid, 8 as android, 9 as anthropoid and 3 were flat. In general it was thought that manipulative and accidental factors were the more important etiological agents in prolapse of the cord, e.g., premature rupture of the membranes, bagging or manual rotation of high heads, increased pressure incidental to struggling under anesthesia, and length of cord.

Fetal salvage was poor. The total babies who died were 28 (39 per cent), viable babies who died 23 (32 per cent). The degree of cervical dilatation at the time of prolapse is of major significance in fetal mortality. With the cervix fully dilated 36 live babies and 9 dead were obtained. In incomplete dilatation 7 live and 19 dead babies resulted. The time factor and ease of prompt delivery were the important factors in securing a living child. In some cases the baby's condition before treatment of the cord was so poor that no form of delivery would have helped.

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normal pattern and subject to its own peculiar aberrations, it is hoped that the postplacental hour can be more intelligently and uniformly handled, especially by those who too often assume that the labor is over with the delivery of the placenta.

Most of the deaths caused by obstetric hemorrhage take place during the hour immediately following placental separation and expulsion. These deaths occur because too much confidence is placed in a few quick massages of the uterus and a cubic centimeter of ergot or pituitrin. They may also occur because the need for immediate blood transfusion is not recognized, or it is given too late, or facilities are lacking for immediate transfusion. Hence, recognition of the first postplacental hour as the "fourth stage" with its incorporation as such into the clinical labor records, would protect the mother, render an obstetric lesson to medical students and nurses, and serve as a guide and a check on the obstetrician.

In consideration of the physiology of the fourth stage of labor there are two main parts: the contractile phase and the hemorrhagic phase. The first is subdivided into 4 stages. (a) Uterine myotamponade. This is the stage of immediate uterine contraction in which tamponade is achieved by compression, kinking, and twisting of the uterine vessels enmeshed in the myometrial whorls. This is the first line of defense against postpartum hemorrhage. (b) Uterine thrombotamponade. At this time there is secondary relaxation with formation of placental site sinusoidal and intrauterine hematomas. This is the second line of defense against hemorrhage. (c) Myouterine indifference. During this time the uterus may remain in a state of iso, hypo or hypertonicity, or alternate between the three. Gentle palpation without expression of clots is the procedure of choice. (d) Fixed myouterine contraction.

The second physiologic phase of the fourth stage is the hemorrhagic one. This is further subdivided into traumatic hemorrhage (uterovaginal tract laceration bleeding) and atonic hemorrhage. The latter is divided into two components, one clotting associated with placental separation, and the other non-clotting hemorrhage arising from denuded myometrium.

(In the last analysis, hemorrhage is responsible for more obstetric deaths than any other complication. This fact is likely to be lost sight of because the International List of Causes of Death (1) classifies deaths from ectopic pregnancy, rupture of the uterus and abortion bleeding under headings other than hemorrhage; and (2) it includes under deaths due to hemorrhage only those cases in which the patient actually bleeds to death, that is, dies of exsanguination. In addition to these fatalities there is another and very important group of cases in which a massive but sublethal hemorrhage renders the patient so vulnerable to infection that she later succumbs to peritonitis or septicemia. These latter cases are always classified under infection but it seems probable that it was the hemorrhage, together with the manipulations carried out in its treatment, which was the determining factor in most of them. Although the size of this second group cannot be ascertained with precision, general experience would indicate that it is a large one and that the sum total of the two groups exceeds the number of patients dying from puerperal infection or toxemia.)

With these facts at hand, the importance of Greenberg's paper is more forcibly brought to our attention because the most frequent cause of fatal obstetric hemorrhage is postpartum hemorrhage, and the most frequent time for postpartum hemorrhage is Greenberg's "fourth



stage of labor." Quite apart from theoretical considerations, if the coining and general usage of this term would help in emphasizing the potential hazards of this period, all obstetricians I am sure would favor it.

Speaking of postpartum hemorrhage, it has always seemed to me a curious lapse that one of the most efficacious means of treating this complication and the standard method employed in Great Britain, is scarcely known in this country. It is not even mentioned, with one exception, in any of our textbooks and in the case of that exception it is improperly portrayed. I refer to bimanual compression of the uterus as illustrated in Figure 13.



FIG. 13. BIMANUAL COMPRESSION OF THE UTERUS

By rotating the internal hand the knuckles stimulate the musculature of the anterior wall to retract while massage by the external hand does the same to the posterior wall. Meanwhile, as the two hands press both walls together, the venous sinuses of the placental site are compressed and thereby more or less occluded. One has almost as much control of the uterus as at cesarean section.

This measure, as it is now understood, was first described by G. Hamilton of Falkirk, Scotland in 1861. Hamilton, however, had previously used and reported a somewhat different procedure, as shown in the following quotation:

"In the paper above referred to (*Edinburgh Monthly Medical Journal*, October, 1850), I mentioned a method I had for many years pursued of restraining postpartum hemorrhage, viz., the introduction into the vagina of the right hand, seizing hold with this of the neck or part of the body of the uterus, compressing it at the same time with the left hand, through the parietes of the abdomen. In my later experience, I have found that usually the most effectual mode of restraining the hemorrhage in such instances is to pass the fingers of the

right hand under the uterus, which the relaxed state of the parts generally allows being easily done, and then firmly to compress the walls of the uterus between the two hands. This method, in every case where I have had to use it—and they have been very numerous, and sometimes very severe—has proved completely successful; and I often think with pleasure, while treating this alarming affection, of the confidence which a resort to the simple expedient mentioned now gives me, compared with the dread and uncertainty with which I encountered it in the early part of my professional experience.” (Edinburgh Med., J., 7: 313-321, 1861)

It will be noted that in Hamilton's earlier method he seized the cervix with his hand. However, he later gave this procedure up for bimanual compression of the body of the uterus, as illustrated in Figure 13. As all British textbooks show, it is this latter procedure which is the common method used throughout the British Isles in the treatment of the severer forms of postpartum hemorrhage. In the DeLee-Greenhill textbook, it is the earlier method which is illustrated,—the one which Hamilton himself abandoned. As far as I am aware this grasping of the cervix is not regarded as bimanual compression of the uterus and, indeed, it would seem to be a rather illogical and futile procedure.

Bimanual compression of the uterus has many points in its favor: 1. It provides for massage of both the anterior and posterior walls of the uterus, and if we agree that abdominal massage of the uterus is efficacious, it would seem plausible to suppose that this measure would be doubly efficient. 2. It requires no invasion of the uterine cavity and hence the likelihood of introducing infection is much less than in packing the uterus. 3. No special equipment is required. 4. It has proved highly efficacious in countless obstetricians' hands, including my own, and as indicated above, is the standard method recommended in all British textbooks, which incidentally decry packing the uterus. Just why bimanual compression of the uterus has been almost entirely neglected in the United States, is difficult to understand.—Ed.)

## LATE POSTPARTUM ECLAMPSIA

H. J. STANDER, R. W. BONSNES AND W. B. STROMME

Am. J. Obst. & Gynec., 52: 765-772, 1946

In the New York Lying-In Hospital during the period from 1932 to 1946 there were 70 cases of eclampsia. Of these 24 suffered from the postpartum variety. The first convulsion occurred well within the 72 hour period in 88 per cent. Three cases, however, had eclampsia late, one occurring on the fourth, one on the sixth, and one on the eighth postpartum day.

The three cases are presented in considerable detail and certainly do not represent cases of hysteria, epilepsy, or uremia. The clinical data relating to blood pressure levels, edema, convulsions, eye ground changes, urinary output, symptomatology, neurological findings, and subsequent followup established the diagnosis of eclampsia. The chemical and other laboratory data are as convincing as the clinical findings, and substantiate the diagnosis of postpartum eclampsia. There was an elevation of the blood uric acid and NPN and a fall in the CO<sub>2</sub> combining power. Atypical blood findings can probably be explained on alteration in kidney function as determined by the decreased urea and uric acid clearance tests. There was a complete return of the symptoms and findings

to normal after the eclampsia with the exception of a persistent hypertension in one of the 3 patients.

It is to be concluded that postpartum eclampsia may occur at any time during the first week of the puerperium.

(The findings in this paper are similar to those reported in 1910 by R. W. Johnstone of Edinburgh. In an extensive and critical study of the world's literature on postpartum eclampsia, he dismissed many cases of reported late eclampsia as unsubstantiated, but reached the conclusion that "there are numerous cases recorded as occurring on the 5th, 6th and 7th days in which the diagnosis as formed clinically cannot be cavilled at, so that one is led to put the dividing line back as far as the end of the 7th day". (*Jour. Obst. & Gynaec. Brit. Emp.*, January, 1910). However, no blood pressures were taken on these patients, let alone blood chemistry; and for this and other reasons the skeptical might be inclined to question the diagnoses on these late cases reported by Johnstone. Hence, this painstaking study of modern cases by modern methods is timely and instructive. —Ed.).

## THE TREATMENT OF ACUTE POSTPARTUM THROMBO-PHLEBITIS OF THE LOWER EXTREMITY BY CONTINUOUS CAUDAL ANESTHESIA

R. C. BENSON

*Am. J. Obst. & Gynec.*, 52: 830-836, 1946

Here are presented 5 cases of acute postpartum thrombophlebitis of the lower extremity (3 deep femoral and 2 extensive superficial saphenous) treated by continuous caudal anesthesia with spectacularly prompt and complete cure. These cases form a remarkable contrast to the traditional conservative or supportive method of treatment using rest, elevation, heat, sedation, heparin, dicumarin, penicillin and sulfonamides with a resultant of 6 to 8 weeks in bed followed often by years of swelling, pain and disability.

The pathologic physiology involved in thrombophlebitis centers about vascular spasm and this is the major cause of pain and edema. In the spastic vessels of a thrombophlebitic extremity the blood flow is diminished and the capillary endothelium becomes more permeable due to hypoxia and excess catabolic products. Exudation of fluid occurs at this point, the resorption of which is difficult due to the lowered arterial and increased venous pressure. If the sympathetic nerves involved are blocked the vascular spasm is relieved, pain disappears, collateral circulation becomes effective, capillary permeability is decreased and back stasis relieved.

Continuous caudal anesthesia as the method of sympathetic nerve block constituted a sound, simple and superior procedure in the treatment of acute thrombophlebitis. The technique of choice consists of inserting a 19 gage Hingson malleable needle into the sacral space through the sacral hiatus and after an 8 to 10 cc. test dose injecting a total initial dose of 30 cc. of 1.5% mety-caine. It is believed that analgesia to L.1 is sufficient for the treatment of

right hand under the uterus, which the relaxed state of the parts generally allows being easily done, and then firmly to compress the walls of the uterus between the two hands. This method, in every case where I have had to use it—and they have been very numerous, and sometimes very severe—has proved completely successful; and I often think with pleasure, while treating this alarming affection, of the confidence which a resort to the simple expedient mentioned now gives me, compared with the dread and uncertainty with which I encountered it in the early part of my professional experience.” (Edinburgh Med., J., 7: 313-321, 1861)

It will be noted that in Hamilton's earlier method he seized the cervix with his hand. However, he later gave this procedure up for bimanual compression of the body of the uterus, as illustrated in Figure 13. As all British textbooks show, it is this latter procedure which is the common method used throughout the British Isles in the treatment of the severer forms of postpartum hemorrhage. In the DeLee-Greenhill textbook, it is the earlier method which is illustrated,—the one which Hamilton himself abandoned. As far as I am aware this grasping of the cervix is not regarded as bimanual compression of the uterus and, indeed, it would seem to be a rather illogical and futile procedure.

Bimanual compression of the uterus has many points in its favor: 1. It provides for massage of both the anterior and posterior walls of the uterus, and if we agree that abdominal massage of the uterus is efficacious, it would seem plausible to suppose that this measure would be doubly efficient. 2. It requires no invasion of the uterine cavity and hence the likelihood of introducing infection is much less than in packing the uterus. 3. No special equipment is required. 4. It has proved highly efficacious in countless obstetricians' hands, including my own, and as indicated above, is the standard method recommended in all British textbooks, which incidentally decry packing the uterus. Just why bimanual compression of the uterus has been almost entirely neglected in the United States, is difficult to understand.—Ed.)

## LATE POSTPARTUM ECLAMPSIA

H. J. STANDER, R. W. BONSNES AND W. B. STROMME

Am. J. Obst. & Gynec., 52: 765-772, 1946

In the New York Lying-In Hospital during the period from 1932 to 1946 there were 70 cases of eclampsia. Of these 24 suffered from the postpartum variety. The first convulsion occurred well within the 72 hour period in 88 per cent. Three cases, however, had eclampsia late, one occurring on the fourth, one on the sixth, and one on the eighth postpartum day.

The three cases are presented in considerable detail and certainly do not represent cases of hysteria, epilepsy, or uremia. The clinical data relating to blood pressure levels, edema, convulsions, eye ground changes, urinary output, symptomatology, neurological findings, and subsequent followup established the diagnosis of eclampsia. The chemical and other laboratory data are as convincing as the clinical findings, and substantiate the diagnosis of postpartum eclampsia. There was an elevation of the blood uric acid and NPN and a fall in the CO<sub>2</sub> combining power. Atypical blood findings can probably be explained on alteration in kidney function as determined by the decreased urea and uric acid clearance tests. There was a complete return of the symptoms and findings

The average birth weight was 4 pounds 7½ ounces. There was no appreciable effect on the duration of labor. The toxemias of pregnancy, polyhydramnion, uterine inertia, prolapse of the umbilical cord, and postpartum hemorrhage were much more frequently encountered in multiple pregnancy. The method of delivery of either twin was of secondary importance to the factor of prematurity, insofar as fetal mortality was concerned. Of those second twins allowed more than 20 minutes in which to deliver spontaneously, 63 per cent were eventually delivered by an operative method. It would appear, therefore, that 20 minutes would be sufficient time to allow for spontaneous delivery of the second twin. Immediate intervention is indicated before this time if bleeding or signs of fetal distress occur. Prematurity should not be considered an indication for forceps delivery of the second twin.

thrombophlebitis and this level can usually be maintained by injecting 20 cc. as often as necessary for 4 hours or more. The cycle of 4 hour treatment may be repeated once or more with interspaced "rest" periods, the needle being left in situ during the entire treatment.

Complete relief of pain occurs within 15 minutes and no resumption of discomfort is reported. Slow, regulated exercise is encouraged and the patient is allowed up soon (48 to 72 hours). By this time edema has disappeared also. An elastic bandage or stocking was recommended for a week or more until vascular balance was re-established. No unpleasant side effects to the anesthesia were encountered and no embolism occurred.

### COMPLICATIONS AND FETAL MORTALITY IN 136 CASES OF MULTIPLE PREGNANCY

EQUINN W. MUNNELL AND HOWARD C. TAYLOR

*Am. J. Obst. & Gynec.*, 52: 588-597, 1946

The authors of this report point out that the general complications characteristic of twin pregnancy and the great importance of prematurity as the cause of the high fetal mortality in twin pregnancy have been emphasized by many previous investigators. The increased incidence of the toxemias of pregnancy, polyhydramnios, prematurity, uterine inertia and postpartum hemorrhage are all factors of importance. The handling of the second twin differs in various clinics. McIlroy and Evans advise extracting the second twin if any signs of fetal distress occur, or if the interval is prolonged beyond an hour, because of the danger of asphyxia from separation of the placenta. Beck recommends rupturing the membranes after twenty minutes and considers it a mistake to delay interference longer than one hour. Hirst advises more time up to one hour and fewer versions, to allow the uterus to readjust itself in order to minimize the risk of infection and postpartum hemorrhage. DeLee and Greenhill do not wait more than twenty minutes for the second baby to deliver spontaneously.

In the 10 year period ending May 31, 1944 there were 136 cases of multiple pregnancy delivered on the Obstetrical Service of Bellevue Hospital. Of these, 135 were twin pregnancies, and in one there were triplets. There was one maternal death in this series of 136 cases. In 136 cases of multiple pregnancy delivered in 10 years on the Bellevue Obstetrical Service, the gross fetal mortality rate (28.1 per cent) was four times greater than the gross fetal mortality rate (7.0 per cent), for all deliveries during the same period. The corrected fetal mortality for twins (9.1 per cent) was almost twice as great as the 10 year average for all deliveries (5.5 per cent). Prematurity was the outstanding cause for the greatly increased fetal mortality in multiple pregnancy. Only 53 per cent of the multiple pregnancies were carried beyond 36 weeks of gestation.

bodies had normal infants. The above shows that if the mother has Rh antibodies prior to delivery there is an increased expectancy of a damaged infant but no certainty of such. Absence of antibodies usually, but not always, means the infant will be normal. The discovery of the blocking antibody by Wiener which blocks the usual test for agglutinins may explain the above seeming discrepancies. Therefore, for greater accuracy both a test for the presence of agglutination and for blocking antibodies should be carried out.

Hemolytic disease of the newborn may be produced very rarely by iso-immunization by antigens other than Rh antigens, e.g., different blood sick groupings.

Prophylaxis of hemolytic disease of the newborn falls under many categories. The protection of prospective mothers against iso-immunization is of extreme importance. This can be done by Rh typing before transfusion and the abolition of the practice of giving intramuscular blood to children. Pregnant women should have Rh typing; husbands of pregnant women should be typed and checked to see if they are homozygous or heterozygous. The obstetrician should reassure the patient to allay her fears of having an erythroblastotic child. If in previous pregnancies no serological or fetal clinical evidence of maternal iso-immunization has been found the risk to the child is not much greater than in previous pregnancies. However, once iso-immunization has been established the likelihood of hemolytic disease of the infant progressively increases. When the mother is iso-immunized and when the father is homozygous, 3 questions are presented to the obstetrician: first, the justification for sterilization; second, the justification for therapeutic abortion; and third, the possibility of artificial insemination with semen from an Rh-negative donor. None of these questions has been answered completely as yet.

In prophylaxis of hemolytic disease it is questionable whether the early interruption of the pregnancy or early induction of labor may save some of the infants. One cannot depend on the level of the titer with assurance at present. However, according to Page, Hunt and Lucia, the duration of the presence of maternal anti-Rh titer may serve as a measure of the severity of the hemolytic disease. Although the hazards increase with prematurity, if the findings above are confirmed, the dividing line of serious and subclinical damage falls at approximately 10 weeks antepartum. Therefore, if an Rh-negative mother first shows antibody titer less than 10 weeks before term, it seems advisable to allow spontaneous onset of labor; if the Rh-negative mother first shows antibody titer more than 14 weeks before term there is a great probability that the fetus is already severely damaged by the time that premature induction of labor is feasible. Therefore it seems unjustifiable to induce labor prematurely. There may be some cases in which the antibody titer is first noted between 10 and 14 weeks antepartum, that would profit by premature induction of labor.

Treatment of the erythroblastotic infant consists of the following: When the disease is suspected before delivery, the author cautions against any analgesia or anesthesia which may reduce the oxygen-carrying capacity of the maternal blood. All infants born of Rh-negative mothers should have immediate hemoglobin, red blood count, Rh determination, blood grouping, and count of nu-

## THE NEWBORN

### THE Rh FACTOR IN CLINICAL OBSTETRICS

E. W. OVERSTREET, H. F. TRAUT, M. L. HUNT AND S. P. LUCIA

California Med., 65: 125-130, 1946

Full blown erythroblastosis presents a clinical picture leaving little doubt as to diagnosis. There is a moderate number of newborn infants in whom a definite diagnosis of erythroblastosis cannot be made but who show one or more of the physical signs and laboratory findings associated with the disease, i.e. enlarged liver, enlarged spleen, nucleated red cells more than 5 per 100 WBC, icterus, bleeding tendencies, anemias, golden yellow amniotic fluid, hydrocephalus and edema; these may be evidences of mild trauma to the fetus from Rh iso-immunization. These cases should be most susceptible to salvage.

Data concerning 209 pregnancies resulting in 211 infants of Rh-negative mothers in the Division of Obstetrics and Gynecology of the University of California Hospital are presented. There were 209 Rh-negative mothers, 80 Rh-positive fathers, 19 Rh-negative fathers and 80 fathers with Rh unknown. There were 129 Rh-positive infants, 78 Rh-negative infants, 2 infants with Rh unknown. Of these 211 infants there were 11 cases of frank erythroblastosis, an incidence of 5 per cent. Only 2 survived, a mortality of 82 per cent. Twenty infants showed subclinical hemolytic disease, an incidence of 10 per cent; all 20 survived. Therefore 15 per cent of the infants of Rh-negative mothers showed the effects of iso-immunization with a total mortality of 29 per cent. Of the Rh-positive infants, 5.2 per cent showed frank erythroblastosis; 6.6 per cent showed subclinical manifestations of the disease. Among the Rh-negative infants 0 per cent showed frank erythroblastosis but 2.9 (6 per cent) showed subclinical manifestations.

Although it is said that increasing parity subjects successive Rh-positive infants to increasing risk, the series presented shows 92 (44 per cent) were delivered of primigravidae and 12 (39 per cent) showed evidence of hemolytic disease, 2 with frank erythroblastosis.

Methods are available now to predict to a certain extent the possibility of hemolytic disease of the newborn. All mothers should be typed for Rh. Rh antibody titers must be taken at frequent intervals. The presence of any Rh antibody titer should warn the obstetrician that the fetus is probably being subjected to some hemolytic disease damage. In the series presented 100 per cent of mothers of frankly erythroblastotic infants showed the presence of a trace or more Rh antibodies. Sixty-six per cent of the mothers of infants with subclinical hemolytic disease of the newborn showed a trace or more. Thirty-four per cent showed no titer despite the fact that the infants showed some degree of the disease. Thirty-six per cent of the mothers with a trace or more of anti-



Artificial insemination, as suggested by Potter and Willson and by Levine, might be performed, with due regard for all moral and legal implications.

It is imperative that all Rh-negative females requiring transfusion, regardless of age, receive only compatible Rh-negative blood.

## REVIEW OF CASES OF Rh ISO-IMMUNIZATION DURING THE PAST FIVE YEARS IN THE ROYAL VICTORIA MONTREAL MATERNITY HOSPITAL

N. W. PHILPOTT, J. P. A. LATOUR AND G. J. E. VAN DORSSER

*Am. J. Obst. & Gynec.*, 52: 926-937, 1946

In a total of 12,114 obstetric cases delivered during a 5-year period at the Royal Victoria Montreal Maternity Hospital, there were 37 cases diagnosed clinically as hemolytic disease of the newborn. Of these, 30 were considered as proved, giving an incidence of one case in 404 deliveries.

Of these 30 selected cases, 19 were livebirths and 11 were deadborn. Of the livebirths, 4 died within the first week of life and 2 died of pneumonia. Of the remaining 13 children, 11 were traced and examined; 8 were normal and 3 were markedly retarded mentally, and all have residual spasticity. All children examined could readily be classified as normal or definitely subnormal. Seventeen of the 19 livebirths were treated by repeated blood transfusions and 15 of these were discharged alive from the hospital. The 2 cases not receiving transfusion died within a week after birth. This strongly indicates the value of repeated blood transfusions in the treatment of these infants.

Rh antibodies were demonstrable in 23 mothers post partum; 13 of these were exclusively of the "blocking" type, 3 were of the "agglutinating" type and 7 showed a combination of both. It was noted that the "blocking" antibody persists for a longer time and tends to be of higher titer than the agglutinating type.

In the present series of cases, hemolytic disease of the newborn occurred with greatest frequency with the second and third pregnancies.

Premature interruption of pregnancy did not yield good results in this series. Seven of the 30 pregnancies were interrupted at about the thirty-sixth week, and the ratio of stillbirths was higher than that occurring in the full-term pregnancies. Only one living child has resulted from these 7 interrupted pregnancies.

No other complications of pregnancy could be related to Rh iso-immunization. There was no retroplacental hemorrhage.

The patients in the 30 selected cases had had a total of 84 pregnancies previously, of which 31 resulted in abortions, miscarriages, stillbirths or neonatal deaths. Eight of the 30 mothers had subsequent pregnancies, of which 6 resulted in stillbirths and 2 in livebirths.

cleated red blood cells. Repeat counts should be made to rule out anemia at a later date. All infants born of Rh-negative mothers should not be transfused, but when the red blood count is 3 million or less, transfusion of Rh-negative blood should be used; if no other blood is available, the mother's washed cells may be used. If there is a suspicion of any other reason than Rh iso-immunization as the cause of the hemolytic disease, group O blood should be used. Erythroblastotic infants should not nurse because Rh antibodies are excreted in the mother's milk. In the hydrops variety, plasma may be of more value than blood. Although there is no lack of vitamin K, it may be given. O<sub>2</sub> may be of value.

The author suggests that our present treatment is directed at the symptoms and signs of the disease rather than at the causative pathological processes. Further work may reveal more adequate methods of treatment.

## SOME CLINICAL ASPECTS OF THE Rh FACTOR IN OBSTETRICS

E. L. KING AND J. W. DAVENPORT, JR.

*Am. J. Obst. & Gynec.*, 52:917-925, 1946

In this paper the authors review briefly the fundamental principles concerning the Rh factor, and discuss some of the clinical aspects of this problem in obstetrics. Twelve case reports are presented and commented upon. The writers conclude that tests for the Rh factor, as facilities are available, should be carried out on all pregnant women. The husbands of Rh-negative women should be tested also. If the husband of an Rh-negative woman is Rh-positive, tests for Rh antibodies should be performed. This is imperative in multigravidas and in primigravidas with history of previous transfusion. If none is found on repeated tests, the prognosis for the fetus is good.

If antibodies are found, the titer should be determined at frequent intervals during pregnancy, and if the titer rises as the pregnancy progresses, induction of labor or cesarean section at 7½ or 8 months might enhance the baby's chances. This question is still in doubt.

After delivery, the erythroblastotic infant should be transfused immediately with Rh-negative blood, and this should be repeated as often as indicated. The veins of the umbilical cord may be used.

The chances of securing a healthy child in subsequent pregnancies when one or more erythroblastotic children have been delivered is not good, unless the husband is proved to be heterozygous, in which case it is about 50 per cent. If the husband is homozygous, the next pregnancy should not occur until several years have elapsed after repeated negative tests for antibodies. Even then the risk is great, as the reticulo-endothelial system probably retains the sensitization for life.

ship of the Baltimore City Medical Society. During the first eight months after its establishment laboratory tests were performed on approximately 7,000 pregnant women. Dispensary patients of city hospitals and patients of the City Health Department Obstetrical Clinics are given free service; private patients pay three to five dollars, depending on whether the referring physician requests in addition to routine Rh typing a serologic test for syphilis and a hemoglobin determination.

Patients whose blood samples give negative or doubtful reactions are further tested with three other antisera, including those of Rh' and Rh" specificity. Rh-negative blood patients are tested for antibody content by three routine tests, the blocking test, the agglutination test and the Diamond slide test. Should a positive reaction result, titration of the antibody is attempted by use of the Wiener agglutination technic, in addition to the standard procedure with a 2 per cent suspension of Rh positive cells in isotonic solution of sodium chloride. The presence is thereby indicated of univalent (glutinins) or bivalent (agglutinins) antibodies or both. The patient is informed of her blood group and Rh type, so that further testing is not required at the time of delivery.

Husbands of Rh negative women are then typed and if found to be Rh-positive and of subgroups Rh<sub>0</sub>' (Rh<sub>1</sub>) or Rh', his blood cells are Hr typed to determine whether he is homozygous or heterozygous. Women having Rh-negative blood and having husbands with Rh-positive blood are observed at monthly intervals and oftener in the third trimester and any sign of sensitization is reported to the attending physician.

The laboratory has proved popular and has more than maintained itself financially. Scarcity of necessary sera has prevented a study to determine distribution of the Rh groups but the proportion of Rh-positive and Rh-negative persons has conformed to established figures. In a group of 904 Rh-negative pregnant women, 46 (5.08 per cent) showed signs of sensitization. Knowledge of such sensitization should be valuable in prevention of intragroup hemolytic transfusion reactions.

Other services rendered by the laboratory have been (1) maintenance of a continuous supply of potent serum by voluntary venesection of Rh-sensitized women with sera containing bivalent antibodies; (2) listing of a large number of Rh-negative men to serve as donors in an emergency; (3) use of Rh tests in determining paternity in medicolegal disputes.

## THE RHESUS FACTOR IN INDIANS

G. W. G. BIRD (MAJOR, I.A.M.C.)

Antiseptic, 43: 645-46, 1946

Rhesus antiserum from mothers of children with erythroblastosis fetalis was procured from England and used as a test among Indians for the rhesus factor.

## THE USE OF HEPARIN WHEN PERFORMING EXCHANGE BLOOD TRANSFUSIONS IN NEWBORN INFANTS

A. S. WIENER AND I. B. WEXLER

J. Lab. Clin. M., 31: 1016-1019, 1946

If the syndrome of icterus gravis is initiated by intravascular agglutination or conglutination, complete exchange transfusions may be indicated in severe cases of icterus gravis in newborn infants.

In order for the infant to survive the procedure, blood must be injected and withdrawn simultaneously and at approximately equal rates. The theoretical background for the above hypothesis is discussed. The authors present a technique for performing the exchange blood transfusion circumventing the chief obstacle of coagulation on withdrawal of the blood by the use of heparin. For practical purposes the blood volume of the newborn infant is considered to be 250 cc. It was thought to be advantageous to inject 50-100 cc. more blood than is withdrawn, serving to further increase the proportion of donor's blood.

To test the procedure a 28 day old Mongolian idiot was used. Blood compatible on crossmatch was selected. A blunt 20 gage cannula was inserted into the internal saphenous vein on the left.  $\frac{1}{2}$  cc. of heparin (500 units) was injected through the needle and 500 cc. of citrated blood connected. Then a short bevel 20 gage needle was inserted into the right radial artery. Before the blood was withdrawn 50 cc. of blood was injected and the speed of infusion was kept constant to keep pace with the radial flow maintaining the 50 cc. original advantage. When evidence of clotting occurred, another  $\frac{1}{2}$  cc. of heparin was given into the radial artery. After 400 cc. of blood was withdrawn the radial artery was ligated and the skin sutured. The infusion was continued until 500 cc. had been given—then the vein was ligated and the skin sutured. The entire procedure took 90 minutes. The slight oozing occurring around the incisions was controlled by pressure dressings. The efficacy of the procedure was tested by differential agglutination tests. These showed that 90 per cent of the red cells were the donor's before the last 50 cc. of blood was given. In their experience 5 times as much heparin can be used without harm.

### THE BALTIMORE Rh TYPING LABORATORY

A NEW COMMUNITY PUBLIC HEALTH SERVICE

MILTON S. SACKS, ELSA F. JAHN AND WILLIAM J. KUHN

J. A. M. A., 132: 983-85, 1946

The Baltimore Rh Typing Laboratory has been functioning since Aug. 1, 1945 and was established as a cooperative private venture under the sponsor-

9 hour period before delivery. In two instances the medication was given intravenously 10 minutes before delivery. In all but one case the infants cried within a few seconds of delivery and no resuscitation was required. From this study the authors concluded that demerol and hyoscine, no matter when administered, exert no effect on the respiration of the newborn from 7 minutes to 1 hour of age. It was also shown that a general anesthetic when properly administered, exerts no effect on the respiration of the newborn after 7 minutes of age. During the first hour of life infants born of primiparous mothers had a lower respiratory volume per pound body weight than those born of multiparous mothers. The volume of air inspired per minute per pound body weight is greater during the first hour following delivery than later during the first day of life. The average volume of air was 124.1 cc. per pound per minute in the first hour of life.

## HYPOXEMIA OF THE FETUS

H. F. TRAUT

West. J. Surg., 54: 379-383, 1946

Asphyxia neonatorum with survival is only an immediate acute situation. There may be long range sequelae which result in permanent injury to the central nervous system.

The causes of intrauterine oxygen lack which contribute to the occurrence of asphyxia neonatorum are closely associated with placenta structure and function. Gases, salts and proteinaceous materials are transmitted to the fetus and excretory products from the infant are evacuated in the placental villous system. As pregnancy progresses the fetal blood supply is progressively more closely approximated to the maternal blood by gradual disappearance of the Langhans layers and a shrinking of the connective tissue. This progressive thinning of the villus aids greatly in making for a more adequate exchange during the later months of pregnancy.

The circulation of maternal blood in the placenta is extremely slow and sluggish to allow for enzymatic digestion and transmission of proteins. As a result of this gases can be supplied only in reduced amounts. Consequently the human fetus must adapt itself to an environment of low oxygen tension. Hence, it is very vulnerable to reduced oxygen supply.

The important compensatory mechanisms to offset the inefficiencies of the placenta are: first, an increased number of red blood cells in the fetal blood stream; second, an increased carrying capacity of the fetal hemoglobin; and third, the anaerobic breakdown of placental glycogen which may act as an "oxygen saver."

On the other hand, the pathological conditions which may operate to produce intrauterine oxygen lack are familial and "toxic" degeneration of the placenta, (abnormal senile changes in the syncytium with resultant hemovillous degener-

In Landsteiner and Weiner's experiment, it had been shown that the serum had agglutinated the red corpuscles of 85 per cent of the white people of America and in 98 to 99 per cent of the Negros. The serum received from England had shown an 85 per cent positive reaction in that country.

In India, of 390 bloods examined, only 4 were negative, giving a percentage of 98.9 positive reactions. Thus, the distribution of the rhesus factor among Indians seems to correspond with that of the Negros of America. This is not in agreement with the figures obtained by Greval and Choudhury (*J. Indian M. A.*, 13: 65, 1943), who found 20 negative results among 200 Indians.

If the author's findings are correct, the rarity of rhesus negatives in Indians indicates a remote chance of transfusion incompatibility resulting from the production of anti-rhesus antibodies and erythroblastosis fetalis will also rarely occur. It would likewise be difficult to obtain a rhesus negative donor among the Indians.

## RESPIRATION DURING THE FIRST HOUR OF LIFE

ROBERT H. GOTTSCHALK

*Am. J. Obst. & Gynec.*, 52: 651-656, 1946

Since demerol was synthesized in 1939 by Eisleb and Schaumann, there have been many reports of its effective use and pharmacologic action. The purpose of this author's study was to determine if the use of demerol and hyoscine during labor exerted any action on the respiration of the newborn infant when given in doses recommended by Roby and Schumann and also to obtain accurate information on the respiration of the newborn from the time of birth to one hour of age.

The equipment used in carrying out this study is the same as that developed and used by Deming and Washburn in their report "Respiration in Infancy." Records were obtained by an indirect method. The newborn's body was placed in an airtight cylinder with the head outside of the chamber. A circular rubber collar was used to make an airtight seal around the infant's neck. A spirometer was connected with the airtight cylinder and a writing point was attached to the spirometer float. Recordings were made on a kymograph. Inspiration was represented by upstrokes on the records and expiration by downstrokes.

A total of 68 records of respiration in 40 infants during their first hour of life were obtained. The earliest records were obtained on 2 infants at 7 minutes of age. All records obtained were on full term normal infants, and none of the recordings was made while the infants were crying. Fifty-three records were obtained on 31 newborns whose mothers had received demerol and hyoscine. The minimum dosage was 100 mg. of demerol and 0.6 mg. of hyoscine. The maximum dosage given was 300 mg. of demerol and 1.5 mg. of hyoscine during a

Further experiments exposing guinea pigs to a pressure simulating 23,000 feet for 100 hours, then to an altitude of 30,000 feet for 100 hours, showed no overt symptoms of injury to the brain although one animal showed transient vestibular signs. Four animals were studied; each had focal areas of necrosis in the cerebellum but no generalized cytopathologic change was present.

## OSTEO-CHONDRITIS, NON-SYPHILITIC: ITS IMPORTANCE IN OBSTETRICS

PEDRO ARAYA C.

Bol. Soc. Chile. Obs. y Gin., 11: 35, 1946

When the Schaudin spirochete penetrates the placenta, which is usually after the 5th month of pregnancy, it travels through the blood stream, and localizes by preference in the most vascularized zones of the fetal organism, the osteo-cartilaginous border, and presents the picture known since 1870 as osteochondritis. Virchow's assistant Weger described 3 stages by microscopic and macroscopic observation. His terms are still used. This osteochondritis is usually a manifestation of congenital syphilis, and is more frequent in a stillborn or premature fetus or one dying immediately after birth, than in nursing infants of a few weeks or months. The frequency of osteochondritis has been noted by Birsch-Hirschfeld, Orth, Thomsen and others, to depend on the age of the infant and the intensity of the infection.

Histologic study of tissue must confirm macroscopic observation of the bones. There are 2 histologic forms, (1) early, non-reactive or passive; and (2) late, reactive or active. The first is characterized by: 1-extreme proliferation and hypercalcification of cartilage, 2-presence and abnormal persistence of chondral pillars calcified in form of a net or lattice, 3-deficient formation of subchondral spongy tissue. The latter two phenomena result from the dysfunction or hypofunction of osteoblasts. This reduced activity of osteoblasts is due to local pathologic action of spirochetes. Passive osteochondritis is the early manifestation of congenital syphilis and is the only morphologic sign in stillbirths. Active osteochondritis is characterized by young connective tissue, called granulation tissue. The origin of this tissue has been much discussed by pathologists, who consider it nonspecific, but rather of an inflammatory type.

These morphologic alterations in the bony tissue are readily identifiable by the x-ray. Even though the mother may be serologically negative, the existence of osteochondritis in the fetus has hitherto been taken as an indication of maternal syphilis.

Recently a type of fetal osteochondritis has been noted radiographically, which is not of syphilitic origin. Cases have been observed suffering a sepsis from pyogenic organisms, in which both parents were negative and all clinical signs of syphilis were absent. This type of osteochondritis is attributed to

ation (infarction)). Poor nutrition of the mother, especially vitamin deficiencies, may also be associated with degenerative placental changes.

Apnea and its implications which immediately follow birth, are quite well known but the long range effects of hypoxemia either in utero or at the birth are not so. The experimental findings of Windel in which animal fetuses were kept in a state of low oxygen tension in utero for a considerable time, the study done by Preston on 132 children who had suffered from hypoxemia at or near term, and Beck's figures of 41.5 per cent of the neonatal deaths occurring in the Long Island College Hospital having a clinical diagnosis of intermittent cyanosis previous to death noted, show that degeneration of vital nerve pathways does occur and that they may produce spastic paraplegias, low grade intelligence, behavior and learning problems, epilepsy, etc.

The conclusions to be drawn from this paper all point toward protection of the oxygen supply of the fetus before, during and after birth. The use of opiates, barbiturates, paraldehyde or nitrous oxide as analgesics should be contraindicated when there is any evidence of oxygen want in the fetus. Also it would be wise to limit the use of analgesia in: (a) rapid labors, (b) premature separation, (c) placenta previa, or (d) large maternal hemorrhage.

More frequent use of inhaled oxygen even when the mother does not urgently need it, the judicious use of analgesics, and a most careful observation of the fetus in utero for impending or actual oxygen want, will result in a drop in the number of babies dying of asphyxia neonatorum and there will be fewer instances of damaged central nervous systems in those which survive.

## THE BRAIN AFTER INTERMITTENT EXPOSURE TO SIMULATED HIGH ALTITUDE

A. V. JENSEN AND W. F. WINDLE

*Arch. Neur. Psychiat.*, 56: 346, 1946

This study was done to determine the possible effects on nerve cells of exposure to low partial pressures of oxygen intermittently over relatively long periods. Young adult guinea pigs were subjected to simulated altitude of 23,000 feet 6 hours per day for 6 days a week until they had accumulated 100, 200, 300 and 500 hours in a decompression chamber. At appropriate intervals experimental and control animals were killed. The brain was removed, fixed and sectioned serially. The animals exhibited no symptoms of cerebral damage. The red cells and hemoglobin values increased significantly after 200 hours.

Comparison of brain sections of controls and experimental animals revealed no hemorrhages, vascular changes or glial proliferation. There were no cytological changes, no reduction in the number of nerve cells, no changes in the myelin sheaths of the nerve fibers and no abnormalities in the fiber tracts of the brain.



## OPERATIVE OBSTETRICS

### THE TIME FOR POSTPARTUM STERILIZATION; REPORT OF 150 CASES; BACTERIOLOGIC STUDIES ON THE POSTPARTUM UTERUS

F. E. WHITACRE

With the assistance of W. M. LOEB and LAURA LOEB

Am. J. Obst. & Gynec., 52: 1041-1053, 1946

This paper is based on a résumé of 50 postpartum sterilizations (Group I) performed in the Department of Obstetrics and Gynecology of the Peiping Union Medical College during the years 1939 and 1940, and a series of 100 cases (Group II) from the Department of Obstetrics and Gynecology of the University of Tennessee College of Medicine from 1939 to 1946. The technique of sterilization used was the Madlener operation. The chief indication for sterilization in both groups of cases was multiparity. There was no mortality, thrombosis or embolism in either group, and the morbidity was 12.5 per cent for Group I and 6 per cent for Group II. There was one postoperative complication (wound infection) in each group.

Studies on the normal postpartum uterus show that bacterial invasion occurs soon after delivery. Among 100 uterine cultures, 87 were positive and 13 negative; the latter occurred only among the cultures taken during the first few hours. At the end of 2 hours, only one in 10 cultures was positive. At the end of 4 hours, 6 in 10 cultures were positive. At the end of the first day, 9 of 10 were positive, and from the second to the fifth days, all were positive. In the 100 uterine cultures taken, 123 organisms were found in the 87 positive cultures. Thirty-nine per cent of these were anaerobic *Streptococci*.

It is clear that in many instances it might be necessary to wait a few hours after delivery before sterilization is undertaken, but if the patient's condition is such that one should wait many hours, it is questionable as to whether it should be done at all, and certainly not after the first day.

The bacteriologic studies reported in this paper also support the well-known clinical fact that the removal of membranes or fragments of placental tissue from the uterus shortly after delivery is relatively safe, whereas, the same procedure after the first postpartum day may be a dangerous intervention. With the patient in good condition, she is better protected by carrying out such a procedure in the early postpartum period. The optimum time to perform postpartum sterilization is from one to 2 hours after spontaneous delivery, which means that the period of probable postpartum hemorrhage is over, and the period of probable infection has not yet begun. 1 figure.

(We have performed something over 700 early postpartum sterilizations and on the basis of this experience can endorse everything which Whitacre has to say, except for the fact that we much prefer the Pomeroy technique to the Madlener. The most frequent indication

toxic factors originating in the mother. In the last weeks of pregnancy she appeared toxic and just before delivery eclampsia occurred. Further radiographic studies were made on every child born of a mother suffering from toxemia or tuberculosis. These post-natal pictures confirmed the author's theories. Later radiographic and histologic studies of osteochondritis in the newborn with fetal erythroblastosis, indicated this was also due to toxemia other than syphilis. For 70 years countless newborn sufferers have been castigated as luetic instead of gravidic toxemias.

It may now be stated that whatever hormonal or septic-toxic process (gravidic toxemia) which disturbs the delicate mechanism of endochondral ossification, altering the physiologic equilibrium between the zone of cartilage proliferation, its calcification and formation of first bony plates will give a radiographic and histologic picture of osteochondritis which till recently was considered pathognomonic of congenital syphilis. This toxic factor is not always of bacterial origin, as shown by fetal erythroblastosis. Hence the term osteochondritis is not exact and osteochondrosis is proposed since it does not suggest inflammation. These 70 cases seem adequate to demonstrate the existence of a non-syphilitic osteochondritis identical radiographically and histologically with that produced by *spirochetea pallida*.

(Severe illness of the mother, rapid growth of the infant after birth, deposition of bismuth in the bones of the fetus due to treatment of the mother, as well as erythroblastosis, can give a roentgenographic picture in the long bones of infants indistinguishable from syphilis. Hence, this diagnostic method which we used to employ so faithfully has been generally abandoned in favor of quantitative tests for reagin done every week.—Ed.)

packing. Chemotherapy in the form of sulfadiazine, 2 grams orally or 2.5 grams of the sodium salt intravenously, was started at once and continued every four hours, 1 gram orally with 2 grams of sodium bicarbonate until the temperature had remained within normal limits for three days. Sulfadiazine was given prophylactically in 22 cases (48.9 per cent). Penicillin was used in only three cases (7 per cent).

The authors concluded that their results were better than previous reports because they did the manual removal procedures earlier and hence the patient was in better condition. Since early manual removal performed on a patient in good condition is a benign procedure they believe that radical liberalizing of the indications for it are in order.

### EXTRA-PERITONEAL CAESAREAN SECTION

VICTOR CRASS P.

Bol. Soc. Chile. Obs. y Gin., 11: 115-126, 1946

There are numerous diverse techniques employed in caesarean section. The basic problem is to protect the peritoneal cavity from contamination during and after the operation. The local use of sulfa drugs and subsequent general treatment with them and with penicillin have eliminated much of the danger of infection. But since some organisms are sulfa resistant, it is important to keep the patient in the best condition possible to resist probable infection.

The extra-peritoneal technic was used on 89 patients, with sulfa drugs as coadjuvants. The reasons for caesarean section were: Too narrow pelvis 58, placenta praevia 10, restricted dilatation 10, prolonged labor with fetal injury 5, prolapse of cord 3, dystocia 2; one intraligamentary cyst and 1 vesico-vaginal fistula. Anesthetics used were: ether 60, spinal with percaïne 28, local 1. Five children died within the first few days.

Details are given for each case. There were 38 patients with membranes intact, 10 of whom had slight, mild infections of the abdominal incision. Two infants died, one of luetic icterus; the other was premature, whose mother was operated for placenta praevia. The cases with ruptured membranes are subdivided into 3 groups: (1) doubtful infection, 24, in 10 of which there was post-operative suppuration of the abdominal incision without serious complications; (2) definitely infected, 13, comprising those with membranes ruptured between 6 and 20 hours; in 8 of these there was wound suppuration but no serious complications; (3) severe infection, 13, patients with membranes ruptured more than 20 hours. Sulfamide therapy was given these at the time of operation and results were satisfactory. In this last group there were three infants born dead. There was only one fatality, a 16 year old mother with narrow pelvis (conjugata vera 6.5 cm.), generalized pruritus and vulvar condilomatas. Peritonitis developed after extra-peritoneal caesarean and she died on the ninth day.

in our series has been great multiparity, this being defined as 8 or more previous viable deliveries. The next most frequent indications were chronic hypertensive disease and rheumatic heart disease. As far as we are aware there have been no failures. There has been 1 death in our series from pulmonary embolism on the 12th post-operative and 13th postpartum day. When the operation is done early the incidence of febrility is much lower than when it is performed around the 10th day as was formerly the custom; and Whitacre's bacteriological studies provide a sound explanation for this.—Ed.)

## MANUAL REMOVAL OF THE PLACENTA

### A BENIGN PROCEDURE

C. W. SEWALL AND D. COULTON

*Am. J. Obst. & Gynec.*, 52: 564-573, 1946

The authors of this report point out that not many years ago manual removal of the placenta was considered one of the most dangerous and deadly procedures that obstetricians could be forced to perform; and the average mortality ranged between 10 and 15 per cent. Since 1940 the rate has dropped to roughly 1 to 3 per cent. Undoubtedly the advent of chemotherapy and a stricter aseptic technique has been a significant factor in reducing the mortality, but morbidity has continued to be reported around 42 per cent. The authors feel that it is the conditions associated with most manual removals rather than the procedure itself that has proved to be the cause for high postpartum mortality and morbidity figures. Forty-five cases delivered in two years time by the same visiting and house staffs of the Massachusetts Memorial Hospitals form the basis for this study.

The most important indications for manual removal were blood loss, retention of the placenta, and a desire to explore the uterus. A falling blood pressure or a steady, even if not profuse, loss of blood was taken as sufficient indication for manual removal (37 patients). Retention of the placenta was the second most frequent indication for manual removal, occurring in 8 cases (17.8 per cent). Without blood loss 45 minutes has been taken as the average length of time it is profitable to wait for separation to occur. Waiting longer than 45 minutes before using the Cr  d   method has been fruitless in the authors' experience. If the Cr  d   fails the patient is redraped and while she is under anesthesia and after the cleavage plane between placenta and uterus is identified to rule out placenta accreta, the operation of manual removal of the placenta is carried out. Ergotrate 1/320 grain is given intramuscularly after completion of the procedure, followed by transfusions and intravenous fluids if indicated. Manual removal of the placenta did not increase the time of hospitalization in this series. No mortality was encountered. Morbidity defined as a temperature rising to 100.4  F. or above on two consecutive days, was encountered in only one case (2.2 per cent). Five cases (11.1 per cent) necessitated uterovaginal

local infiltration anesthesia for repairs of incisions and lacerations of the vulvo-vagino-perineal areas sustained during parturition. Because of unsatisfactory results obtained in a series of cases using local infiltration anesthesia the author considered the use of penicillin. Previous reports in the literature using penicillin in the suturing of flesh wounds and the fact that the antibacterial activity effect of penicillin is not impaired in the presence of procaine hydrochloride or metycaine, nor is the effect of the anesthetic agent impaired in the presence of penicillin, encouraged the essayist to try penicillin in a series of 81 consecutive repairs of incisions or lacerations of the perineum.

The solution consisted of 1 per cent procaine hydrochloride in normal saline to which 250 units of freshly made penicillin sodium was added to each cubic centimeter of the solution. The mixture was made fresh at the time of each delivery. An average of 45 cc. was injected into the subcutaneous intramuscular and submucosal vulvo-vagino-perineal area by infiltration. In 77 patients the results were excellent. Three of the four remaining were excellent for one centimeter shallow separations of the skin only at the distal angle of the introitus. In one case a large submucosal hematoma developed in the episiotomy area and extended the length of the vagina. The hematoma was evacuated on the seventh postpartum day and the patient made an uneventful nonmorbid recovery.

There was some increased discomfort to the actual injection of the local infiltration with the added penicillin solution in about 50 per cent of the cases but this varied with the degree of analgesia and amnesia present. The author feels that this procedure is particularly well adapted to smaller obstetric services with minimum facilities and aseptic technique, due to increased distressing personnel problems.

## RELATION OF EARLY RISING TO MORBIDITY IN CESAREAN SECTION

DONALD M. HEADINGS AND RUFUS E. PALMER, III

*Am. J. Obst. & Gynec.*, 52: 661-664, 1946

In this report the authors were stimulated to review their own records by a paper by Johnston in which the mortality rate of cesarean sections done by general surgeons was 14.4 per cent. Dieckmann states that this figure should be below 0.5 per cent. In Norristown, Pennsylvania, there are no obstetricians who perform cesarean sections but obstetric chiefs of service are consulted who in turn refer the cases to a surgeon for operation.

From January 1, 1944 to January 1, 1946, 102 cesarean sections were performed by the senior author without a single death. The fetal mortality rate was 5 per cent. Three of the babies were stillborn and 2 others died within 24 hours of delivery. The morbidity rate was 9 per cent. The authors use a 6 inch Pfannenstiel incision and do low cervical operation, suturing the parietal

Autopsy revealed a fetid, gangrenous endometritis. In her case the infection was secondary, proceeding from the cutaneous and genital affections, and was aggravated by her poor general condition.

## SULFONAMIDES AS A PROPHYLACTIC AGENT IN CONJUNCTION WITH CESAREAN SECTION

H. C. HESSELTINE AND CHRISTINE THELEN

*Am. J. Obst. & Gynec.*, 52: 813-816, 1946

The purpose of this presentation is to give the authors' observations on the deposition of sulfanilamide in 40 patients and sulfathiazole in 3 patients placed under the peritoneal reflection from the urinary bladder to the uterus in association with the closures of the uterine wound at the time of cesarean section.

Practically all the cesarean sections were performed by the laparotrachelotomy technique. The incision in the uterus was closed in two layers, the first layer by interrupted catgut and the second by continuous. When the area covered by the vesico-uterine peritoneum was free from blood and dry, 5 grams of sulfonamide powder was deposited over the uterine fascia. The peritoneum was reattached to the uterine wall. Blood levels of sulfonamides indicate that good absorption can be expected from this site. However, the rates are very erratic and unpredictable.

In this group of 43 patients, 16 of them or 37 per cent, were febrile. This was the highest febrile group in the entire series and there was no evidence of drug sensitization. Hence it was obvious that the use of sulfonamide locally did not lower the morbidity rate nor shorten convalescence and was of no prophylactic value. Also, the bladder peritoneum seemed more adherent in a few patients subjected to subsequent laparotomy.

The conclusions drawn are that sulfonamides should be used on direct medication in relation to a proper bacteriologic study of the uterine cavity and blood stream except when the patient's life or convalescence is at stake. Even then penicillin is preferable to the sulfonamides with but few exceptions.

## ADDITION OF PENICILLIN SODIUM TO ANESTHETIC AGENT FOR LOCAL INFILTRATION ANESTHESIA

VERNE J. REYNOLDS

*Am. J. Obst. & Gynec.*, 52: 641-644, 1946

The author presented a preliminary report on the addition of 250 Oxford Units of penicillin sodium to each cubic centimeter of anesthetic agent used in

## SOCIAL AND LEGAL ASPECTS

### MATERNAL WELFARE AND THE NEGRO

PHILIP F. WILLIAMS

J. A. M. A., 132: 611-614, 1946

Although the recent reduction in the puerperal death rate is gratifying, careful analysis of the index shows a definite disparity between the rates for the white and the Negro mothers. Year after year the Negro puerperal death rate has been double or more than double the rate for white mothers. Why should the Negro puerperal death rate remain double or more than double the white rate and show, in comparison, a ten year lag in its reduction? Is it because of some inherent difference of a constitutional nature, a biologic inheritance? Are the obstetric problems of the Negro essentially unlike those of the white? Does the cause lie in the contrasting situations of economy, education or social heritage?

There is a greater incidence of hypertensive disease in the Negro. It occurs three times as frequently as in the white and appears earlier in the Negro woman. Nephrosclerosis and hypertensive cardiac disease are more frequent in the Negro woman than in the Negro man or in the white race. This factor may explain, in part, the greater incidence of toxemia of pregnancy in the southern Negro.

The relatively poor economic status of the Negro seriously influences the maternity situation. It favors poor hygienic surroundings, the cabin with no sanitary conveniences in the rural South and the congested housing in the northern cities, where the Negro becomes segregated in the oldest and poorest dwellings. Both as a result of economy and of ignorance the nutrition of the Negro is poor; this is frequently observed in the South, where the heavy salt pork diet may predispose to toxemias of pregnancy. The Negroes' poor nutritional intake favors lowered resistance to infection. Anemia of a nutritional type is a common characteristic of the pregnant Negro woman. Not only does she react poorly to hemorrhagic complications, but this anemia predisposes to a greater degree of puerperal morbidity.

Syphilis, the outstanding social problem of the Negro, together with poor economic factors, is responsible for excessively high pregnancy wastage, which always implies a high maternal death rate. The stillbirth rate among Negroes is approximately double the white rate, and it is well known that Negro stillbirths are incompletely registered. The high Negro stillbirth rate is, of course, closely connected with the high maternal mortality rate of the race; it has been repeatedly shown that the risk of maternal death is much greater when the infant is stillborn than when it is born alive. The Negro has a high incidence of pelvic inflammatory disease; this, in turn, tends to an increase in the incidence and severity of puerperal infection.

Whether or not it is dependent on a lower moral code, crowded housing,

peritoneum to the uterovesical peritoneum to prevent contamination of the general peritoneal cavity. The uterus is closed in two layers with a continuous suture of chromic catgut No. 1; and a cotton technique is used for the closure of the abdominal wound; cotton No. 40 for anterior sheath of the rectus; cotton No. 70 for subcutaneous tissue and skin. Continuous spinal anesthesia was used in all the cases. No postoperative catheterization was done in this series of cases. The most important factor was early rising postoperatively. Forty-nine patients were allowed out of bed on the first postoperative day, 11 on the second and 10 on the third. Seventy of the 102 cases were out of bed on the third day or before. The morbidity was only 2.8 per cent.

In this series of 102 cases there were no cases of thrombophlebitis, phlebotrombosis, upper respiratory infection, pulmonary embolism, cystitis, wound dehiscence and only 1 wound infection. The authors felt that early rising definitely lowered morbidity following cesarean section. They also felt that in the hands of the well trained surgeon the operation of cesarean section can be, and is, a safe procedure. The morbidity and mortality can be and sometimes are lower in such hands than in those whose work is strictly limited to obstetrics.



supervision of a trained obstetrician, adequate antepartum supervision, constant medical and nursing attendance during labor and a minimum of operative interference; and good hospitals have been cooperative and available. During the first four years of this privately supported charity, according to Tucker and Benaron (*Am. J. Pub. Health*, 27: 33-36, 1937), the mortality rate, both obstetric and nonobstetric, for the Negroes who were attended, including those referred to hospitals, was 22. This rate was less than half the rate for white, and about one-third of the rate for the nonwhite in Chicago during the same period.

In Alabama, with a large rural population, maternity clinics have been set up, supervised and financed by the state. The attending clinicians are local physicians, most of whom are white, and they work under the supervision of the state obstetric consultant. The number of clinics was 120 in 1942 and 80 in 1944. In 1943 the clinic cared for 28 per cent of all the Negro maternity cases in the state. Early registration was sought to provide ample opportunity for education, elimination of infection and thorough screening to permit early and efficient hospitalization if there were complications. Most of the Negro clinic patients were delivered at home by midwives, some were delivered at home by physicians and a few received hospital care at delivery. The three years of this service, Cunningham (*Am. J. Obst. & Gynec.*, 48: 278-280, 1944) points out, have cut the state Negro maternal mortality rate in half. The clinic rate for Negroes in 1943 was 21, the nonclinic white rate 23, the nonclinic Negro rate 52.

Obstetric care has undergone an evolution in this generation, but the Negro has not participated fully in the benefits of modern obstetrics. It is not possible to have two systems of maternal welfare; there must be one all-inclusive health program. Health education and adequate maternity care for the Negro are amply provided for in the proposed national health program of the American Medical Association. Conservation of human life in the process of reproduction should be shared equally by all Americans. The interest and activity of the medical profession can bring this about.

## NEGRO MORTALITY

### II. THE BIRTH RATE AND INFANT AND MATERNAL MORTALITY

MARY GOVER

*Public Health Rep.*, 61: 1529-38, 1946

Whereas the birth rate, infant mortality and maternal mortality were declining almost equally among the Negroes and the whites for the period from 1920 to 1936, since that time, the birth rate has increased for both races, and the infant and maternal mortality has declined even more rapidly, particularly among the white population.

neglect of adolescent children or a psychologic basis, there is a high rate of illegitimacy in the Negro race. Illegitimacy predisposes to the interruption of pregnancy with resulting infection, to pregnancy in the very young and to a lack of what maternity care may be available, all factors known to be associated with a high mortality rate. Frequent pregnancies and extremely large families are the rule in groups with a low economic status and decidedly affect maternal mortality; the Negro is no exception to these influences. Family planning programs which are now being carried on among southern Negroes are too recent to show a measurable effect on maternal mortality.

The largely rural distribution of the Negro in the South predisposes to home delivery, with a lack of facilities to combat emergencies and with inability to obtain prenatal care: the scarcity of physicians and economic reasons result in an inferior grade of attendant at birth—the untrained midwife.

The educational and intellectual deficiencies of the Negro favor poor obstetric results. These unfavorable factors are often discouraging to those who attempt health education programs among Negroes. The white patients fare better through years of conditioning by medical attention. The Negro's reaction to disease is primitive. He delays seeking medical aid for any condition not productive of pain.

While the Negro has little understanding of the nature and importance of maternity hygiene and care, at the same time his medical care is insufficient and inefficient. Dowling (*Am. J. pub. Health*, 27: 803-808, 1937) points out, in an analysis of a survey of maternal mortality, that errors in judgment and technic as well as neglect on the part of the physician were 50 per cent more frequent in the care of colored mothers. Hospital facilities for Negroes are extremely inadequate; hospitalization of many Negro obstetric patients is of an emergency character. The increase in hospital births has been more sharply pronounced for the white than for the Negro. In 1943 more than three-fourths of the white but only one-third of the nonwhite births occurred in hospitals.

Negro physicians are too few to give adequate care to the race. In 1942 the population per physician for Negroes was about five times that for all races. Present day Negro medical education is unfavorable to improvement in the ratio. The lack of hospital facilities for the obstetric training of Negro physicians adds to all the other hazards of Negro maternity patients.

Underwood of Mississippi writes that through proper health education and health supervision there is no reason why the Negro maternal mortality rate should not approximate the white rate. The lack of health education and adequate medical attention may well be the crux of the unfavorable position of the Negro.

The practical application of these two principles has been effectively demonstrated in Chicago by the Chicago Maternity Center and in Alabama by the Division of Maternal Health of the State Health Department in cooperation with the medical profession.

In the Chicago Maternity Center poverty has been the only prerequisite for the home delivery service; patients have received competent care under the

the problems of the first few weeks of life. The largest single cause of neonatal death is prematurity but the more skillful use of oxygen, the maintenance of body temperature by means of incubators and properly heated nurseries, maintenance of fluid balance, and the use of blood have lowered the mortality rate considerably.

For the further lowering of mortality rates, the author suggests the following plan: further development of the resident system of education with financial subsidy if necessary—it is suggested that medical foundations, state and federal governments; could well contribute to the health of the nation by subsidizing this training; an extension of the postgraduate work with subsidy possibly necessary here also; the elevation of hospital standards which should do much toward decreasing the number of infections; consultation services may be advisable for smaller communities; emphasis of antenatal care; efforts should be made to establish blood banks in smaller communities; further study of the problems of prematurity with an effort to prevent prematurity by proper antenatal care and management of the causes.

Infant mortality since 1920 has been estimated as approximately 65 per cent higher for Negroes than for whites in the states having birth registrations. From 1928 to 1935, the annual rate of decline in maternal mortality was 2.5 per cent for both races; the level of the Negro rate was almost twice that of the white. Since that time the rate of decline has been approximately 7.0 per cent for Negroes and 9.5 per cent for white women.

From 1938 to 1940 infant mortality in the United States was 66 per cent higher for Negroes than for whites; Southern sections have relatively high infant mortality. Only in northern cities of 100,000 or more population is the recorded Negro infant mortality rate lower than it is in southern rural areas.

Maternal mortality is higher among Negroes than whites and higher in the South than in the North; in the North maternal mortality increases as the size of the city decreases; in the South the Negro maternal mortality rate is exceptionally high in towns and small cities.

## MATERNAL, FETAL AND NEONATAL MORTALITY

D. G. MORTON

California Med., 65: 18-21, 1946

The author reviews the most important causes for the constant decrease in maternal, fetal and neonatal mortality in the past 10 years.

Education is the most important factor in the diminishing mortality rates; its use is 4-fold. By education is meant the modern system of resident specialty training. The various specialty boards also are a means to raise medical standards because of their requirements of training in the basic medical sciences as well as hospital training in the clinical aspects of the specialty. Along with the above educational program has come the tendency for hospitals to review their cases and results; this demands the keeping of accurate hospital records and many times improves the results by prompting more consultations before procedures are attempted. Education of the public is extremely important in increasing the amount of prenatal care among pregnant women.

Since the most important single cause of maternal death is infection, the advent of sulfonamides and penicillin has proven to be a potent factor in the lowered mortality rates.

The third important factor in the reduced maternal mortality is the increasing availability and use of blood to combat shock and blood loss.

The factors responsible for the reduced fetal and neonatal mortality are more adequate antenatal care with better management of the toxemias, more careful use of operative vaginal delivery, a greater appreciation of the dangers of analgesia, better methods of resuscitation, and probably most important of all, chiefly due to the resident training program, a better understanding of

## PRESENT STATUS OF TRANSFUSION OF WHOLE BLOOD AND ITS DERIVATIVES IN OBSTETRICS AND GYNECOLOGY

L. H. TISDALL

Am. J. Obst. &amp; Gynec., 52:788-793, 1946

The therapeutic use of blood transfusions is of great importance in obstetrics and gynecology because of the frequency of sudden and alarming hemorrhage and the high incidence of maternal deaths due to hemorrhage. This requires a thorough knowledge of the proper method of collection, preservation and administration of blood, as well as various tests for blood groupings, Rh factor, and cross-matching, and the awareness that the transfusion of some blood or plasma may result in antibody formation.

The best system for collection, preservation and administration of whole blood is the closed vacuum bottle technique using the ACD solution which is a mixture of citric acid, sodium citrate and dextrose. This will adequately preserve whole blood for 21 days.

The proper transfusion of whole blood requires the administration of group and Rh compatible blood. The role played by the Rh factor is well known. Rh negative women may become sensitized as the result of carrying an Rh positive child or being transfused with Rh positive blood. Hence Rh determinations should be done on all obstetric patients and potent human anti Rh serum used for such determinations. If the Rh status of a patient to be transfused is unknown, Rh negative blood should be used. A well organized and carried out prenatal plan of action should be effected on all Rh negative mothers to insure prompt and proper transfusion of Rh negative blood to the infant as soon as it is indicated.

An incompatibility between the A and B blood factors may cause congenital hemolytic anemia. A high titer of anti A or anti B agglutinins in a mother with a group A, B or AB fetus may cause this condition. This high titer may be brought about by the administration of pooled plasma, the injection of incompatible whole blood and by the parenteral use of any solution containing group specific substances A and B, hence can be avoided.

In the emergency treatment of shock and hemorrhage Rh negative group O blood, with a low titer of iso-agglutinins should be given at once. The indiscriminate use of group O blood is condemned because such blood may contain a high titer of iso-agglutinins. Also any group O blood in which the agglutinin titer has been reduced by the addition of group specific substance A and B is condemned.

The reactions following whole blood transfusions may be classified in three main groups: (1) pyrogenic or thermal. They are characterized by chills and fever during or shortly after a transfusion, and are caused by either foreign substances or toxic products of bacterial growth; (2) hemolytic. It is characterized by chills, fever, lumbar pain, hemoglobinuria, and if severe, oliguria, anuria, and subsequent death; and is caused by group or Rh incompatible blood, rarely

## MISCELLANEOUS

### ENVIRONMENT IN OBSTETRICS

J. H. MOORE

*Am. J. Obst. & Gynec.*, 52: 993-999, 1946

As a result of his efforts to improve the environment in obstetrical practice the author has concluded that, aside from the factor of environment, there is no difference between rural and urban obstetrics, but that there is a tremendous difference between good and bad obstetrics. Good obstetrics is a composite of several factors. First is a sound knowledge of the fundamentals, which should be obtained in our medical schools. Second is a sustained professional interest; in a rural state, environment is important in developing this. Third is the importance of integrating all agencies whose object is improvement of obstetric practice under the leadership of the medical profession.

In 1935 the North Dakota Committee on Maternal and Child Welfare was formed. This committee attacked the problem of maternal mortality in North Dakota and recommended that outstanding clinicians be brought to the state to conduct obstetric and pediatric seminars. A program was developed by which North Dakota physicians may avail themselves of postgraduate instruction in bedside obstetrics.

An analysis of maternal deaths in 1943 showed that 2 factors were chiefly responsible for a rise in mortality: injudicious operative obstetrics and inadequate blood substitutes. The first factor is nationwide and education is still needed to impress physicians with its dangers. The second factor was particularly important in North Dakota. In 1944 a State Plasma Bank was established. This change in environment has benefited not only the practice of obstetrics, but of medicine and surgery as well.

The next, and the writer believes the most far-reaching and important, step, will be the establishment of a 4-year medical school at the University of North Dakota. Plans include the integration of a number of established hospitals throughout the state into a teaching program with the University and bringing the University students into close teaching contact with a number of the excellent practitioners throughout the state.

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# Maternal Mortality Reports

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*(Secretaries of Maternal Mortality Committees are invited to submit selected cases of maternal deaths, with analyses appended, for publication in this section of the Survey. Cases should be chosen on the basis of educational value, not because of rarity. For obvious reasons complete anonymity will be maintained.*

*Readers should note that the comment which follows each case history represents the opinion of the Committee concerned and does not necessarily reflect the attitude of the Editors.)*

## CASE NO. 32

The patient was a thirty-one year old white multipara who was admitted to the hospital in early labor for delivery and sterilization because of the existence of rheumatic heart disease. Her family history was non-contributory and her own past history reveals that at eight years of age the patient suffered from an attack of acute rheumatic fever. Since that time she has had episodes of joint pains particularly during the winter months. Seven years ago the patient had an acute recurrence of rheumatic fever which was treated by her family physician. Other than the above there had been no serious ailments.

The history of the one previous pregnancy was that six years ago the patient was under the care of her obstetrician in consultation with an internist throughout the entire prenatal period. A diagnosis of rheumatic heart disease with mitral stenosis and mitral insufficiency was made at that time. Her prenatal course was normal and was followed by a normal labor and puerperium. Both mother and child were discharged from the hospital in good condition.

During the present pregnancy the patient consulted her family physician who referred her to another physician with the advice to consider the interruption of the pregnancy because of the cardiac disease. This second physician, in turn, referred the patient to an obstetrician and it was thought that the pregnancy should be allowed to continue and that sterilization should follow delivery at term. The patient was followed carefully by both her obstetrician and the medical consultant and her prenatal course was normal with the exception of a few episodes of dyspnea at night associated with a small amount of pinkish frothy sputum. These attacks were of short duration and were followed quickly by a return to normal. Ten days before admission to the hospital the patient's heart rhythm shifted from normal to that of auricular fibrillation. At this time she was confined to bed and put on digitalis. The heart rhythm returned to normal in a short course of time and remained so for the rest of the prenatal course. The medical consultant advised that the delivery of the patient be by vagina.

On admission to the hospital the membranes were found to be ruptured, uterine contractions occurred about every ten minutes. There was some cardiac irregularity more pronounced at the height of each pain. The pulse rate was 90 per minute, blood pressure 130/80, the heart was slightly enlarged on percussion and there was present an aortic and pulmonary systolic murmur. The lungs were clear to percussion and auscultation. Labor progressed rapidly and after being given a small amount of nitrous oxide for induction followed by ether and oxygen per mask the patient was delivered at 4:40 P.M. on June 1 of a full term living child weighing 7 lbs. 13 oz. by a low forceps operation after a central episiotomy was performed. The total duration of labor was four hours and following delivery the patient's pulse for the next three days varied between 90 and 60 per minute and the heart

by iso-agglutinins such as anti Hr or anti M; (3) allergic. These are usually manifested as urticaria, occasionally asthma, rarely as anaphylactic shock.

If whole blood is not available, blood plasma may be used for the emergency treatment of hemorrhage. Pooled plasma is capable of producing iso-agglutinins, so, if possible, it is desirable to use group compatible plasma.

Pyrogenic reactions require no therapy other than symptomatic. Allergic reactions respond well to epinephrine. The treatment of hemolytic reactions consists of transfusion and glucose and saline.

#### LEVELS OF PENICILLIN IN THE BLOOD AFTER THE USE IN THE VAGINA AND RECTUM OF SUPPOSITORIES CONTAINING PENICILLIN CALCIUM: PRELIMINARY REPORT

SIM B. LOVELADY, LAWRENCE M. RANDALL AND S. MARJORIE HOSFELD

Proc. Mayo Clinic, 21: 401-403, 1946

A group of postpartum patients who were without complications and who had been confined to bed and received two enemas previous to delivery, were selected for study of the effect of penicillin suppositories placed in the vagina or rectum. Suppositories containing 100,000 units of penicillin were placed in the vagina of 36 patients and in the rectum of 33 others. Three and five hours after insertion of the suppository the level of penicillin in the blood was determined by the slide-cell technic.

Higher blood levels were noted three and five hours after three suppositories were used vaginally, than when three were used rectally, but this may have been due to the presence of a group of colon bacilli in the rectum. Suppositories were used successfully in a small number of ambulatory patients with acute vaginitis. The results obtained from this study seem to indicate the use of these suppositories as a routine prophylactic measure in preparation of patients for delivery, especially if premature rupture of the membranes has occurred. They may also be used in preparation of patients for cesarean delivery, and for subtotal, total abdominal or vaginal hysterectomy.



firmed but the fetal heart could not be heard. At the time of the rectal examination it was noted that there was a great amount of edema of the external genitalia. The amount of cervical dilatation was not definitely determined at this time but it was thought to be almost complete with the breech at the level of the spines. Labor was quite active and the patient complained a great deal with each uterine contraction. She was given some sedation and intravenous fluids in the form of glucose and saline and although the pulse improved somewhat in quality it remained at the rate of 140 per minute and the patient continued to bear down vigorously with each pain. Three hours after admission the presenting part was on the perineum and the patient was prepared for delivery. After she had been typed and cross-matched for transfusion and 500 cc. of plasma had been started she was anesthetized for delivery.

At this time it was found that there was a laceration of the left labium and a deep tear of the vagina anteriorly and on the right extending well up into the vaginal tract. The presentation was a frank breech which could not be extracted as such and on introducing the hand to bring down a foot a considerable rent in the uterus upon the right was discovered. Decomposition of the breech was accomplished without great difficulty and the body of the baby easily extracted. The head, however, did not enter the pelvis there being a very apparent and marked contraction of the inlet present. Accordingly a craniotomy was done and the collapsed fetal head extracted with the aid of forceps. A full term dead child weighing 7 lbs. 2 oz. was delivered at 5:00 P.M. The placenta followed almost immediately after delivery but the uterus remained relaxed and the patient was bleeding slightly. Her condition had been desperate throughout the delivery and as soon as she had received all of the plasma whole blood was started but before she could receive more than a few cubic centimeters her respirations ceased.

A postmortem exploration of the birth canal revealed an extensive vaginal laceration, a laceration of the cervix extending well up into the lower uterine segment and a transversed tear of the uterus about 10 centimeters long. There were a fair amount of old dark blood clots in the peritoneal cavity. The diagonal conjugate was measured at this time and was estimated to be about 9 centimeters. Autopsy permission was not granted.

*Discussion:* This primipara with a breech presentation, allowed to remain in labor for forty-eight hours without recognition of a markedly contracted pelvis, was the victim of gross negligence. Failure to seek reliable consultation sufficiently early to prevent many of the subsequent complications was inexcusable. The lack of support during this long period was evidenced by the dehydration and shock on admission to the second hospital. One can readily imagine what sort of attempts were made at delivery by the findings of examination after delivery: the lacerated labia, torn vaginal tract and ruptured uterus. Perhaps the administration of blood somewhat sooner in the second hospital might have done some good, but so much damage had already been done that it is doubtful if this would have made any difference in the ultimate outcome.

#### CASE NO. 34

The patient was a thirty-eight year old colored multipara who was admitted to the hospital on May 23 at 10:20 A.M. A note by the hospital physician who saw her on admission stated that the patient was in "impending shock" with respirations which were very rapid and shallow, pulse very rapid and thready, fetal heart sounds not heard and the umbilical cord could be seen protruding from the vagina. The blood pressure was 50/20. The patient was seen in the hospital at 11:30 A.M. by a physician, who, according to his statement, had answered the distress call of the patient's family physician because the patient had been in a state of "prolonged dry labor for eight hours." When seen at home

rhythm remained normal with no signs of decompensation. During all of this time the patient was being given small doses of digitalis. On June 3 it was decided that the patient should be sterilized. A general anesthetic was chosen because of the apprehensive nature of the patient although local anesthesia was considered at the time. The patient was given nitrous oxide and oxygen for induction anesthesia which was followed by open drop ether. A Pomeroy sterilization was performed, the duration of the operation being forty minutes and of the anesthetic fifty-five minutes. Immediately following the operation the patient's respirations were 20 and the pulse rate 100 per minute and the blood pressure 120/70. One half hour later the pulse had risen to 120 per minute and the respirations to 24. For the next nine hours the pulse ranged between 92 and 120 per minute and during most of this time the patient slept. About 4:00 A.M. the patient awoke, became dyspneic and began coughing up pink frothy sputum. Examination revealed that the patient was suffering from a considerable degree of pulmonary edema. At 4:10 A.M. she was given morphine and atropin and more digitalis. At 5:00 A.M. increased doses of digitalis were given along with 50 per cent glucose, aminophyllin and oxygen by mask. For a time her condition seemed improved. At 4:00 P.M. on June 5 the patient again began coughing up large amounts of pink frothy sputum and became restless and apprehensive. Her condition rapidly became worse and in spite of stimulation and oxygen she died at 1:20 A.M. on June 6. No autopsy was obtained.

*Discussion:* There were two observations made during the prenatal course of this patient which indicated that she was a class 3 cardiac with very low reserve. These were first, the repeated nocturnal episodes of dyspnea associated with pinkish frothy sputum, and second, the attack of auricular fibrillation. These constituted clear-cut evidence that the patient was in borderline failure and should have served as a warning that her heart probably could not stand any appreciable strain. Of course, hindsight is easy but even without this it would seem that an astute clinician, experienced in the ways of the pregnant cardiac, might have spotted these evil omens; and might have foreseen the fact, moreover, that the third day postoperative was no time to tamper with this patient. Many women with heart disease go into failure between the second and fifth day postpartum even without operation and, indeed, this seems to be a particularly common time for decompensation to occur. After considerable discussion it was the opinion of the committee that this was a preventable death on the grounds that the operation for sterilization should have been postponed until the patient had completely recovered from the stress of pregnancy and labor. Better alternatives would have been to carry out the operation on the fourteenth day or so, or to recommend a diaphragm and jelly.

#### CASE NO. 33

The patient was a twenty-two year old white primipara who was admitted to the hospital on February 6 having been referred by her own physician because of a breech presentation and a prolonged labor. Her family and past histories were non-contributory and this pregnancy had apparently been uneventful. Labor began at term and she was admitted to a small private hospital. After approximately forty-eight hours of labor she was given an ether anesthetic and delivery was attempted. This was unsuccessful and the patient was transferred to another hospital where she arrived about noon on the date noted above. On admission to the second hospital her temperature was 98.6° Fahrenheit, her pulse rate 164, and her respirations 24 per minute. She seemed to be somewhat dehydrated and in moderate shock. Upon abdominal palpation the diagnosis of a breech presentation was con-

The examination on admission showed a temperature of 102° Fahrenheit, pulse rate 90 per minute and respirations normal. The abdomen was tender on pressure in the lower quadrant but no masses were palpable. The impression on admission was that the patient had an incomplete abortion. The hemoglobin was 78 per cent and there were 3,860,000 red blood cells and 6,600 white blood cells.

On December 20, the day after admission a dilatation and curettage was done at which time a considerable amount of placental tissue and many blood clots were obtained. Both dull and sharp curettes were used to complete the scraping. A uterine pack was inserted and removed in twenty-four hours. The report from the Pathological Laboratory on the tissue removed at the time of the curettage stated that the sections showed old placental tissue. The patient was placed on sulfa therapy and repeated blood transfusions were administered during the next several days. Repeated blood cultures showed a positive growth for the staphylococcus aureus. On October 2 a portable x-ray of the chest showed soft spotty infiltration throughout the inner portion of both lungs, suggesting a moderate grade of bronchial pneumonia. There was also slight clouding of the costo-phrenic angle on the left side.

In spite of therapy the patient continued to run a temperature as high as 105°F., at times dropping down to 100.5°F., occasionally with a pulse rate which averaged 120 per minute. Her condition gradually became worse and on December 10 after being in the hospital for twenty-one days respirations ceased. No autopsy was obtained.

*Discussion:* While formerly many authorities recommended curettage in the presence of infection of the genital tract, and some few still persist in the use of the curette in the treatment of the incomplete infected abortion, most clinics today teach that its employment is, in the majority of instances, more dangerous than the infection itself and has frequently been the cause of death. Perforation of the uterus, occurring more frequently than many like to admit even in the hands of the skillful, and traumatism to the uterine wall, which often converts a superficial infection into a strongly invasive one, are two of the ever-present dangers of this non-conservative treatment of septic abortions. The presence of hemorrhage of course may force interference, but otherwise expectant treatment, utilizing all of the magic bullets placed at our disposal in recent years along with blood transfusions, will result less often in parametritis, peritonitis and death than the immediate emptying of the uterus through the use of the curette.

by this second physician prior to admission to the hospital the patient was complaining of a great deal of abdominal pain. She was said to have gone into active labor at 2:00 A.M. and the membranes were thought to have ruptured at 5:00 A.M. The family physician had noticed the protrusion of the cord and the hand and after several attempts to replace the prolapsed parts and to deliver the patient he reached the conclusion that the patient had best be hospitalized.

On admission to the hospital the abdomen was found to be protruding for the most part above the umbilicus. Labor pains were apparently frequent and hard and there was a slight amount of bleeding visible. The patient's pulse rate was 110 per minute. On rectal examination it was determined that there was either a hand or a foot lying loose in the vagina. There was no note on the history as to the dilatation of the cervix. The patient was given 3 grains of seconal at 11:30 A.M., placed in shock position and a search made to get donors. This was unsuccessful and in the absence of a blood bank in the hospital no blood was administered. After a delay of about 1½ hours while the attempt to obtain a donor was going on, the patient was taken to the delivery room and the decapitation of a dead fetus was performed. The placenta followed shortly after this. The operation was performed with ease and an extremely small amount of bleeding was noted. The uterus was firm and the vagina was packed with sterile gauze.

The patient was sent to the ward in fair condition. At 1:35 P.M. the pulse rate was 135 and the respirations were 56 per minute. The patient's pulse continued weak and thready and in spite of stimulants her respirations ceased at 3:55 P.M. There was no record of an excessive amount of external bleeding either before or after arrival at the hospital. No blood pressure readings were recorded postoperatively and there was no record of intravenous glucose plasma or blood having been given. Postmortem examination was not obtained.

*Discussion:* If this patient with a rapid and thready pulse, rapid and shallow respirations, a blood pressure of 50/20 was in "impending shock," the Committee wonders what this attendant would consider a real state of shock. Think how much damage must have been done when the attempts were made at home to replace the prolapsed parts and to deliver the patient. It is the Committee's guess that accouchement forcé played no small part in the operator's efforts to effect a delivery. And then she was hospitalized! No blood bank, no donors available, so the patient must be delivered without them. In the absence of other agencies which will make blood available for anyone needing it in the entire community, many feel that it is the duty of the state or local health authority to take on this need as a public health problem and either sponsor or actively organize a county or state-wide set up whereby whole blood will be made readily available for any type of patient needing it, whether an expectant mother or not. Surely no one will deny that many lives would be saved throughout the United States through such a procedure.

#### CASE NO. 35

The patient was a thirty-two year old white multipara who was admitted to the hospital on September 19 with a complaint of vaginal bleeding of two week's duration following a fainting spell. During the third day prior to admission to the hospital the patient stated that she had passed a large piece of fleshy material which had a putrid odor and during these three days she had fever. The history reveals that the patient's last menstrual period was June 26. She denied any attempts at termination of the pregnancy either by herself or others.

caused extensive luteinization of the recipient ovaries. These results indicated that liberation of the hypophyseal luteinizing factor was minimal in the absence of estrogen, the factor remaining stored within the pituitary gland. ¶

Pituitaries from oophorectomized adult female rats which had been injected with estradiol benzoate daily for 30 to 45 days produced follicular development but no corpora lutea, due to removal of the luteinizing factor by the estrogen treatment.

## EXPERIMENTAL CARCINOMA OF THE ENDOMETRIUM INDUCED BY ESTRADIOL AND ITS RELATION TO CLINICAL CARCINOMA

ANDRES RIESCO U.

Bol. Soc. Chile. Obs. y. Gin., 11: 7, 1946

This article reports an investigation of the time factor in the fibromatogenous action of small quantities of estradiol. Do animals maintaining a continuous absorption of small quantities of estradiol for 4 or 5 times the usual period of administration, show any modification of their reaction to estrogens? Six female castrate guinea pigs weighing 300 to 400 grams, received subcutaneous implants of tablets containing 5% estradiol in cholesterol. On autopsy after 125 days, the absorption of 1 microgram daily of estradiol had provoked estrogenic and fibromatogenic effects identical with those of previous experiments. The tissues of these six animals were kept as controls.

These same tablets, recovered from the tissues of the controls were implanted a second time in six other guinea pigs, weighing 250 to 450 grams. These were autopsied after 550 days. Estrogenic and fibromatogenic effects were practically equal in both groups. Both showed growth and reddening of the nipples, opening of the vagina, metrorrhagia, and increased weight of uterus. Tumors developed, ranging from 0.5 to 6.0 in the controls and 0.5 to 4.5 in the second series. In contrast to this, there was a profound difference in the histology of the endometrium. The controls showed marked cystic glandular hyperplasia with some endometrial polyps, similar to earlier experiments. The 550 day animals also had this same hyperplasia, uterine fibromas, etc., but with an infiltration of malignant neoplastic tissue and proliferation of the mucosa, which almost obliterated the lumen of the horns. This tumor development also invaded the muscular coat of the uterus, with the same cystic formation. The cell structure had regular, but markedly hyperchromic nuclei. There was no inflammation. Diagnosis: malignant adenoma.

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# Gynecology

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## ENDOCRINOLOGY

### EFFECT OF MAMMALIAN PITUITARY GONADOTROPINS ON OVULATION IN THE FROG, *RANA PIPIENS*

P. A. WRIGHT AND F. L. HISAW

Endocrinology, 39: 247-255, 1946

The writers have found fractionated extracts of sheep pituitary glands effective for inducing ovulation in adult frogs (*Rana pipiens*) and in bits of the ovary *in vitro*. A preparation of follicle-stimulating hormone produced ovulation in normal frogs but did not cause ovulation in the hypophysectomized animal or in fragments of ovary *in vitro*. However, in both the hypophysectomized frog and in the *in vitro* experiments, the FSH preparation brought about a sensitization of the follicles so that they responded more readily than normal to an appropriate ovulating stimulus.

A combination of FSH and luteinizing hormone caused ovulation in normal and hypophysectomized frogs and in ovarian fragments *in vitro*. Hypophysectomized frogs were the more sensitive to equivalent doses of FSH and LH, but the response of normal frogs was more predictable. A crude alkaline extract of sheep pituitary glands also induced ovulation in normal frogs.

These data show that the gonadotropic hormones of the mammalian pituitary are as effective in promoting ovulation as material from frog pituitary glands. Furthermore, the mammalian hormones seem to act on the frog's ovary as they do in mammals.

### ACTION OF ESTROGEN ON RELEASE OF HYPOPHYSEAL LUTEINIZING HORMONE

A. A. HELLBAUM AND R. O. GREEP

Proc. Soc. Exper. Biol. & Med., 63: 53-56, 1946

The present experiments showed that the pituitaries of adult female rats, under normal estrogen influence, stimulated moderate luteinization in normal and hypophysectomized recipient immature female rats. The pituitaries of adult female rats freed of estrogen stimulation through oophorectomy invariably

## ADVANCES IN ENDOCRINOLOGY

E. C. Dodds

Practitioner, 157: 263-269, 1946

The most recent developments in endocrine therapy have been the use of thiourea and related compounds in treating thyrotoxicosis, and the use of synthetic estrogens in treating malignant disease.

Treatment of thyrotoxicosis with thiourea has been carried out by many workers, either as an alternative to thyroidectomy or as a means of preparing the patient for operation. In this manner, symptoms may be relieved, with reduction in basal metabolic rate and pulse rate, and increase in weight and plasma cholesterol. Williams and Clute, in a report of 152 cases, found that patients undergoing thyroidectomy were a much less serious risk than those prepared with iodine alone. The importance of careful observation for toxic reactions is emphasized. The most serious ones reported are agranulocytosis and leucopenia. It appears to be considered wiser to give small doses over a long period than to attempt to obtain quick results with large doses.

The benefit of estrogen therapy in cases of carcinoma of the prostate has led to an attempt to control other forms of cancer. It appears that a very small percentage of cases of carcinoma of the breast are thus benefited. The author has tried enormous doses in cases of inoperable carcinoma of the breast without producing any results whatsoever. However, it is the opinion of experienced clinicians in this field that the administration of synthetic estrogens to inoperable cases of carcinoma of the breast is a justifiable empiricism.

The author discusses the various synthetic estrogens and gonadotrophic hormones. It is concluded that, on purely rough clinical judgment, stilbestrol is the most potent of the synthetic estrogens, dienestrol next and hestrol the least potent. A single dose of  $\alpha, \alpha$ -bis (p-ethoxyphenyl)- $\beta$ -phenyl- $\beta$ -bromoethylene (called DBE) is effective for a long period. This effect has been ascribed to the fact that, unlike other estrogens, DBE is not inactivated by the liver or rapidly excreted, but a considerable amount is stored in body tissues. However, the prolonged action is of doubtful advantage. The benefit of the stilbestrol series of compounds is that if withdrawal of treatment becomes necessary, it is followed by rapid excretion and cessation of effect after 24 hours.

As for the gonadotrophic hormones, the only available preparations are chorionic gonadotrophin and follicle-stimulating gonadotrophin. A mixture of the 2 ("synapoidin") has been used with some success in treating amenorrhea, functional uterine bleeding and sterility. Some workers have found that the best results were obtained by the administration first of the follicle-stimulating gonadotrophin, followed by chorionic gonadotrophin.

(This very conservative paper is by one of the leading British endocrinologists, whose name is associated with the early work on non-hormonal estrogens. The temporary benefits conferred by estrogen therapy in cases of advanced prostatic cancer, especially when as-

These findings demonstrated the importance of the time factor. The control group of 125 days treatment produced benign tumors. In the test group of 550 days on the same dosage, the tumors developed into malignant adenomas.

The guinea pig is normally resistant to carcinogenic substances, whether estrogens or hydrocarbons. The significance of the extended time factor becomes greater when it is noted that the malignant adenomas were infiltrative rather than a tumor mass. These findings parallel those in the clinic. It is well established that cystic glandular hyperplasia of the uterus in women follows excessive or prolonged stimulation with estrogenic hormones. Clinical records show that patients suffering this same cystic hyperplasia over years eventually develop an endometrial adenocarcinoma.

Authors differ on the cause of the coexistence of a fibromyoma and an endometrial adenocarcinoma, that is, as to whether the latter is due to resultant irritation or merely coincidence. Their experiments indicate that the uterine fibromyoma and the cystic glandular hyperplasia of the endometrium are not local effects but symptoms of the general injury due to long, continuous estrogenic action. But since more than half the cases of adenocarcinoma occur in women after the menopause, when the ovaries are atrophied, estrogens are drawn from some as yet undiscovered source. Estrogens have been determined in the blood and urine of carcinomatous women past the menopause.

(The remarkable fibromatogenic, pseudoneoplastic reactions to which the guinea pig, above all other species, is so prone as a result of prolonged and excessive estrogen treatment are well known, thanks to the investigations of Lipschütz and his co-workers. The interesting experiments of Andres, however, indicate that not only is there a response on the part of the fibrous tissue of the pelvis and abdomen, but that the endometrium likewise responds, with the production of marked hyperplasia and even "malignant adenoma".

It is not evident from the abstract whether these histologically malignant lesions continue to progress autonomously after cessation of the estrogen stimulation, eventually killing the animal, or whether, as I suspect is the case, they spontaneously regress after discontinuance of the estrogen. This is of obvious importance in deciding whether or not estrogen can produce actual cancer of the endometrium in this species. While real cancer of the breast has been produced in several species by means of estrogen, uterine carcinoma has thus far, so far as I know, been produced only in mice (Gardner). However, in various species of animals, and also in humans, the persistent administration of estrogen can bring about, not only hyperplasia of the ordinary Swiss-cheese type, but also highly adenomatous and proliferative pictures which are easily mistakable for adenocarcinoma. I have seen a number of instances of this sort from the injudicious employment of stilbestrol.

The author's belief that the long continuance rather than the large dosage of estrogen is the important factor is in line with the concept of other investigators. Apparently the persistent exposure of the endometrium to what might be spoken of as a chronic hormonal irritation is more dangerous than to subject it to a single dose or to only a very few large doses. One might loosely compare this to the difference between a single severe trauma on the one hand, and a chronic irritative lesion, as regards their predisposing effects in the development of cancer. I was interested to note his comment on the possible predisposing role of postmenopausal estrogen of extra-ovarian origin in the later development of cancer, as I personally believe that this is a factor to be reckoned with.—Ed.)



out of balance by excessive and continuous amounts of hormone. If the pellets cause other disturbances such as mastalgia or prolonged metrorrhagia they should be removed if possible. If this cannot be done, symptomatic treatment should be given to relieve the patient. The implantation of crystalline hormone should be restricted to menopause patients who do not improve with other treatment.

(While the implantation of estrogen pellets by one technique or another has been advocated by various authors, especially in treatment of menopausal symptoms, it has always seemed to me to be an ill-advised plan. It will be conceded by everyone that such implanted estrogen is readily and continuously absorbed for considerable lengths of time, but it is just this persistent treatment with estrogen which should be avoided in menopausal cases, especially as there is always uncertainty by this method as to what amount of estrogen the patient is getting at any time.

These disadvantages are as a matter of fact illustrated in the 3 cases reported by the author. One developed swelling of the breasts, with "painful tension"; another developed griping pains and metrorrhagia, lasting 26 days, and the third, a patient with sterility and amenorrhea, also later developed metrorrhagia with endometrial hyperplasia, requiring curettage. I submit that this is poor organotherapy. I can see no justification or reason for it. The authors themselves state that the "rhythm of the genital cycle may be thrown out of balance by excessive and continuous amounts of hormone", although they rather naively add that if unpleasant symptoms develop and the implanted pellets cannot be removed, the undesirable symptoms can be treated symptomatically.

Far more sensible in the minority of menopausal women who need estrogen therapy is the oral administration of either the natural estrogens or the synthetic non-hormonal estrogens, which should be administered only when and if the vasomotor symptoms are sufficiently troublesome, and never continuously. It is almost never necessary to use hypodermic medication, which has many obvious disadvantages. The great advantage of oral therapy is its convenience and ideal flexibility, as well as its cheapness if the non-hormonal estrogens are employed.—Ed.)

sociated with bony metastases, have naturally led to similar efforts in mammary cancer, but as Dodds says, with very little success. The same statement would seem to apply to the employment of testosterone in advanced breast cancer, if one may judge from the few reports on this subject in the literature.—Ed.)

## INJURIES CAUSED BY IMPLANTATION OF PELLETS OF ESTROGENS

ROBERTO M. GORI AND LORENZODI GUGLIELMO

An. Inst. Matern. y. Asist. Soc., 7: 46-50, 1946

Rapidity of absorption of injected hormones depends on the vehicle containing them. Slow absorption is more beneficial and an oily or wax vehicle is therefore more acceptable for parenteral administration. Since even this requires repeating the dose at frequent intervals, a method for inserting the crystalline substance subcutaneously was devised. With this, one implantation is usually adequate for a long period of time, as the hormone is absorbed much more slowly.

Implants were thoroughly tested on animals before being applied to human patients. This method has been quite successful in relieving the distressing symptoms of menopause. Pellets containing a total of 20 to 50 mg. of estrogens are inserted in the gluteal muscle in the lumbar region. There may be general and local discomfort after implantation or the symptoms may be transferred to the genitals in the form of hemorrhage, or there may be a mastalgia.

Three cases are described in which these effects were noted. Two were treated for alleviation of menopausal symptoms, with 30 mg. of dioxydiethylstilbene dipropionate inserted in the gluteal muscles. One patient noted an increase in the size of her breasts, with painful tension, which receded slowly. She was given symptomatic medication, and after five months she noted only the symptoms which had existed before the implants. The second patient suffered griping pains in various regions which culminated in a metrorrhagia on the 53rd day after implants were made. This persisted 26 days, and eventually subsided. Ten months later she presented only the typical symptoms of loss of sex hormones. The third case, aged 31 years, was treated for presumed sterility and amenorrhea. She was first given a specific diet, thyroid, gonadotrophin and finally estrogens. Hormone therapy was suspended in 6 months when menstruation reappeared. A second amenorrhea was again relieved by hormone injections. A third recurrence was treated by implantation of pellets totaling 50 mg. synthetic hormone. Menstruation developing into metrorrhagia occurred. Nine months later she received a second implant of 50 mg. Metrorrhagia continued. A curettage was performed and the tissue removed was diagnosed histologically as glandular cystic hyperplasia of the endometrium.

The implantation of pellets is a recognized and approved method of relieving the distresses of menopause, but the rhythm of the genital cycle may be thrown

## THE TREATMENT OF BENIGN MENOPAUSAL BLEEDING

J. R. WILLSON

J. Kansas M. Soc., 47: 493-495, 1946

The principal benign lesions associated with increased climacteric bleeding are: (1) irregular endometrial stimulation by the failing ovary; (2) uterine fibroids; (3) cervical polyps; (4) pelvic inflammatory disease; (5) medical complications (hypertension and blood dyscrasias); and (6) pregnancy accidents. Every bleeding patient deserves thorough examination, including a complete history and physical examination and careful evaluation of the pelvis. If no cause for the bleeding is discovered, a diagnostic dilatation and curettage should be done.

When it has been established that the bleeding is of benign origin, the type of treatment must be decided upon. In most instances control of bleeding is necessary. In properly selected cases this may be effected either by hysterectomy or by the establishment of a radiation menopause. Irradiation should be reserved for patients over the age of 42. Younger patients should be treated by hysterectomy with conservation of at least one ovary. A fibroid uterus which is larger than a 10 to 12 weeks' pregnancy should be removed. Those smaller may be irradiated if bleeding is the only symptom. Pedunculated fibroids contraindicate irradiation. Soft tumors should be removed because of the possibility of degeneration and infection. Surgery is imperative in cases of ovarian neoplasms. The amount of radiation necessary for castration has no effect on these growths. In cases of pelvic inflammatory disease surgical removal is preferable to irradiation.

If the bowel is adherent to the uterus as a result of previous surgery, irradiation may result in stenosis or even perforation.

Although the high incidence of cancer developing in uteri which have been irradiated seems to be a point in favor of total hysterectomy, the immediate mortality rate from the latter procedure is several times higher than the former, and this will nullify any cancer deaths which may occur. However, these may be kept at a minimum by observation after treatment.

AMENORRHEA NOT ASSOCIATED WITH PREGNANCY  
IN YOUNG WOMEN

L. M. RANDALL

Am. J. Obst. &amp; Gynec., 52: 975-983, 1946

This paper is based on data for 94 young women between the ages of 19 and 25 years who came to the Mayo Clinic and who had not menstruated for a year or longer. They have been divided into 5 groups for the purpose of discussing conditions associated with their amenorrhea.

## THE MENSTRUAL CYCLE

### ENDOCRINOLOGY AND TREATMENT OF FUNCTIONAL UTERINE HEMORRHAGE

E. C. HAMBLÉN

Nebraska M. J., 31: 497-501, 1946

The author defines functional excesses of uterine bleeding as resulting from disturbances in the normal bleeding mechanism. Since functional disturbances of bleeding can be understood only when the normal mechanisms of bleeding are known, the writer reviews our concepts of the elements which regulate the menstrual cycle and control menstruation.

The hormonology of functional excesses of bleeding is related to variations in normal mechanisms of the menstrual cycle. When a break in the normal mechanism occurs, there results a disturbance in both ovarian and pituitary functions. There may be a failure of estrogen levels to increase during the latter part of the bleeding phase, there may be an extremely rapid and marked fall of estrogens, or there may be a teetering of estrogen levels, causing prolonged and excessive bleeding. These breaks in function may be followed by a recovery of ovarian function before the function of the pituitary is altered. If this is not the case, the pituitary gonadotropic activity is altered. There is a compensatory increase in the follicle stimulating activity of the pituitary with a resulting increased outpouring of ovarian estrogens. The ovaries secrete only estrogen, and fail to ovulate and to secrete progesterin. Thus, nearly all recurrent functional excesses of uterine bleeding occur from interval or estrogen-prepared endometriums.

Cyclic estrogen-progesterin therapy has been applied to the correction of the functional disturbances which result in excessive flowing. Only temporary hemostasis results from estrogen therapy or curettage. Accordingly, the first series of cyclic estrogen-progesterin therapy begins when bleeding ceases or immediately following curettage. The author's basic formula for cyclic therapy is summarized by him as follows: "Conjugated estrogens are given orally, 1.25 milligrams three times daily, for twenty days. During the last ten days of this treatment, 10 milligrams of oral progesterin are given orally three times a day. If bleeding recurs before the twenty days of treatment have been concluded, therapy is discontinued. Therapy is resumed on the fourth or fifth day of bleeding, thereby initiating the second series of treatment which is given similarly to the first series." Usually 3 or 4 series of estrogen-progesterin therapy are sufficient to yield a salvage of normal ovarian function in most patients.

(This is a very satisfactory review and grouping of a fairly large number of cases of amenorrhea, and I do not think that anyone can find any worthwhile fault with it. The author does not in this paper discuss the matter of therapy, although he has done this in another publication. In the so-called pituitary cases of amenorrhea which are so often thus diagnosed on rather incomplete evidence, he states that in 56 per cent the basal metabolic rate was markedly lowered. My own experience with this group has been that the majority showed either a low normal or slightly subnormal rate.—Ed.)

Group I consisted of 19 patients with primary amenorrhea. These patients exhibited a combination of developmental and functional defects that defies exact classification. There were 3 cases of congenital absence of the vagina. Seven patients presented normal secondary sex characteristics with no estrin (or minimal amounts) in the urine, with marked uterine hypoplasia and atrophy of the endometrium. Six patients showed underdevelopment of the secondary sex characteristics with uterine and endometrial hypoplasia and absence of estrin in the urine. Patients in this group merit careful study in order to exclude disease and to select the occasional patient who may benefit from treatment.

Group II consisted of 7 patients having amenorrhea associated with tumors. Four of the tumors were located in the pituitary, one in the floor of the fourth ventricle and 2 in an adrenal gland. These cases emphasize the importance of complete examination in young women with amenorrhea. The early diagnosis of chromophobe tumors of the pituitary and suprasellar tumors is often made only by roentgenograms of the sella turcica.

Group III included 15 patients with amenorrhea associated with anorexia nervosa. The majority of these patients had experienced normal menstrual function prior to the onset of amenorrhea. Examination revealed marked weight loss, appearance of age, pallor without anemia, dryness of skin and hair, intolerance to cold and low blood pressure and pulse rate. The basal metabolic rate was low, the endometrium atrophied, and values for estrogens, gonadotropins and 17-ketosteroids in the urine were very low or absent. In these patients there is usually a history of marked alteration in diet which has led to alteration in all bodily functions, including that of the genital tract.

Group IV consisted of 17 patients with secondary amenorrhea associated with failure of the ovary to function. Symptoms resembled those of the menopause. Assays for amounts of estrogens in the urine gave varying results from none to normal or high normal amounts. High values for gonadotropins were found in 10 patients. The amenorrhea in this group of cases was considered primarily due to failure of the ovary to function. The fluctuating hormonal imbalance produced the associated symptoms.

Group V included 36 patients having secondary amenorrhea associated with failure of gonadotropic secretion by the anterior lobe of the hypophysis. Thirty-six per cent of the group gave a history of abnormal menstruation prior to the onset of amenorrhea, as compared to 70 per cent in the group primarily experiencing failure of ovarian function. In 56 per cent of this group the basal metabolic rate was markedly lowered. Gonadotropins and estrogens were either absent from the urine or present in minimal amounts. In those patients who had experienced abnormal menses prior to the onset of amenorrhea, the anterior lobe of the hypophysis may always have been at fault. It is not known whether the frequently associated lowered rate of metabolism is a cause or effect.

It is concluded that when amenorrhea occurs in young women, it should be considered as a major symptom. The patient merits a complete investigation, for amenorrhea may be associated with organic disease as well as with derangements of function.

## THE UTERUS

### ADENOMYOSIS OF THE UTERUS

#### A STUDY OF 52 REPORTED CASES AND A REVIEW OF THE LITERATURE

SAMUEL D. SPATT

Am. J. Obst. & Gynec., 52: 581-587, 1946

The author of this report in a series of 52 cases of adenomyosis uteri attempted to correlate the endometrial architecture as an interpretation of the genesis of this pathologic entity. In the previous literature Hofbauer assumed the constant association of endometrial hyperplasia with adenomyosis uteri, whereas Dreyfuss believed the endometrium exhibited a normal picture corresponding to the phase of the menstrual cycle in cases of adenomyosis uteri. Von Rokitsansky first described adenomyosis as a clinical entity in 1860. Cullen was the first to describe the condition in the English literature (1897).

The incidence of this disease is difficult to determine from previous reports in the literature because they vary from 5 to 52 per cent of cases of extirpated myomatous uteri. The difference in the incidence of adenomyosis as reported by various workers may be accounted for by the fact that slight "dipping down" of the endometrium into the myometrium is called adenomyosis by some, and ignored by others. In the authors' series adenomyosis was characterized by a marked downgrowth of endometrium into the muscular layer. The age incidence of the previous literature all agrees that the greatest number of cases occur in the fifth decade. The youngest case described by Holden in a 14 year old girl began six months after the onset of menstruation with severe dysmenorrhea. The adenomyotic tissue was within a definite fibroid in this case and would be an argument against those who believe that repeated childbirths or abortions play a role in the genesis of adenomyosis.

In the present series the uterine endometrium was studied in 50 cases of adenomyosis uteri and endometrial hyperplasia was present in 19 cases. Early interval nonsecretory endometrium was also present in 19 cases. In 43 cases of adenomyosis uteri there were 3 cases of senile endometrium, 1 case of "mixed endometrium," and 8 cases of secretory endometrium. The anovulatory cycle then was present in 31 cases or 72 per cent. Because most men accept early non-secretory endometrium as hyperestrinism the author felt that both hyperplasia and adenomyoma have an identical etiologic factor.

After numerous references to the literature regarding the role of hyperestrinism, the incidence of fibromyomas and other benign pelvic pathology associated with adenomyosis uteri, the author derived the following conclusions:

1. Adenomyosis uteri occurs in 5 to 10 per cent of all myomatous uteri.
2. The uterine wall is the site of aberrant endometrial tissue in 15 to 30 per cent of all cases of endometriosis.

## VULVA AND VAGINA

### "HEMATO-COLPOMETRA DUE TO CONGENITAL ABSENCE OF THE EXTERNAL PORTION OF THE VAGINA"

A. DIAZ INFANTE

Ginecologia y Obstetricia de Mexico 4: 213-220, 1946

The case presented in this paper concerns a 13-year-old girl presenting symptoms of acute abdomen for the past 3 days. Her complaints started 3 months ago, with pain all over the lower abdomen, periodic and spasmodic-like in character. The abdomen was very distended and tender, so as to not permit a thorough examination. The patient was operated upon with the diagnosis of appendicitis. The appendix, however, proved to be entirely normal. Following its removal, the internal genital organs were explored through the same incision. The uterus was found to be as large as a 6-weeks pregnancy and nearby a hard, larger tumor was encountered located in the pelvic cavity, which was evidently the vagina, enormously distended with fluid. Suspecting the possibility of a hemato-colpometra, the patient was submitted to gynecological and rectal examinations, which revealed a congenital atresia of the vagina with normal hymen, and with the vagino-uterine canal greatly distended with menstrual blood. Rectal examination showed the inferior extremity of the vagina located above the level of the sphincter ani.

Through a vertical midline incision in the hymen and perineal skin down to the region of the sphincter ani, the fascio-muscular plane of the levators was opened, and the inferior occluded portion of the vagina thus exposed. The latter was freed and mobilized from the adjacent organs and then incised. Almost 1250 cc. of a dark fluid was thus removed. Since the vagina was so much distended, it was possible to bring its inferior extremity down and suture it to the skin wound. Recovery was uneventful and the operative results very good.

In order to avoid such diagnostic errors, the author advises that rectal examination be done even in young girls even though still at the puberty age who present acute abdominal symptoms.

(This abstract from the comparatively newly established official organ of the gynecological and obstetrical society of our sister republic to the south, gives an opportunity of congratulating the officials of that organization upon the splendid appearance and content of all the numbers which have thus far appeared. Under the able editorial guidance of Dr. Carlos D. Guerrero it is sure to fulfill a valuable function.

The case of Infante, from the description given by him, was not one of imperforate hymen, which is the usual cause of such hematocolpos and hematometra as this patient had. There was evidently a congenital atresia of the lower vagina just above the hymen level. The abdominal operation in this patient would have been altogether avoided had a preliminary rectal examination been made, though the omission is perhaps not so culpable in view of the fact that the patient was only 13 years old. The history is often helpful in that menstrual molimina and sometimes actual colicky pains are described as occurring at about monthly intervals. The injunction laid down by the author himself as to the importance of rectal examination in such cases will stand underscoring.—Ed.)



As Spatt's figures show, endometriosis and adenomyosis, and I might also add hyperplasia, often co-exist. I have always felt that there is some common etiological thread concerned, but what it is no one can say, though the usual speculation is that it is hormonal. Only in the case of hyperplasia is this established. On the other hand, I have always felt that adenomyosis is much more likely to be of hormonal origin than myoma, for which this etiology is so commonly suggested, on evidence which so far is entirely inadequate.—Ed.)

## CONTROVERSIAL FACTORS IN THE MANAGEMENT OF FUNDAL CARCINOMA

L. C. SCHEFFEY, W. J. THUDIUM, D. M. FARELL AND G. W. HAHN

*Am. J. Obst. & Gynec.*, 52: 529-43, 1946

A relatively slow but gradual evolution in the management of fundal carcinoma has occurred in recent years. Surgery has and continues to play the major role in treatment, so that the unsolved question today is, to what extent irradiation therapy can be relied upon as a valuable adjunct. The authors of this report are strong advocates of the advantages of irradiation therapy in conjunction with surgery as a planned procedure in treating fundal carcinoma.

During the period between September 1, 1921 and September 1, 1945, a consecutive series of 159 patients with fundal carcinoma have been observed on the Gynecologic Ward and Private Services at the Jefferson Medical College Hospital. Of these 159 cases, 104 were eligible for a five year survival study based on various plans of treatment. Two previous reports in 1937 and 1943, utilized portions of the material forming the basis for this paper. The authors decided in this presentation not to stress entirely the overall end results observed throughout twenty-four years, but selected a more rational approach to the solution of the cure or arrest of fundal carcinoma by selective discussion of trial and error methods, which have led to a more or less standardized plan of treatment.

Surgery alone without any form of irradiation has played a negligible role in the treatment of fundal carcinoma at Jefferson Hospital. In this group consisting of adequate surgery alone a five year survival rate of 62.5 per cent—eight to twenty years after operation was obtained. This figure can be compared with another small group of cases in which inadequate surgery was performed with a five year survival rate of 25.0 per cent.

Radium therapy alone was used on 31 patients, in the sixth decade of life, poor operative risks, or in cases where postirradiation surgery was refused. The authors believe that there will always be instances in which surgery cannot be attempted, that radium therapy alone will be justified in lieu of the increased primary operative mortality. Of the 31 patients treated solely with radium, 80 per cent of whom ranged in age from 55 to 77 years, a five year survival rate of 45.8 per cent was reported. The radium dosage during the past decade has

3. Adenomyosis uteri is most common in the fifth decade of life, as is endometrial hyperplasia.

4. Menometrorrhagia is the most common complaint, and dysmenorrhea second, most common in patients with adenomyosis uteri.

5. The sustained interval nonsecretory endometrium is a part of the process leading to actual endometrial hyperplasia and should be classified with it. The early interval endometrium seems to occur in younger women and endometrial hyperplasia in older women generally.

6. Adenomyosis is associated with anovulatory menstrual cycles in a large percentage of cases, indicating that either hyperestrinism or lack of corpus luteum hormone is an important factor in the genesis of adenomyosis uteri. It cannot be said definitely, however, which one is responsible.

7. The high incidence of fibroids in adenomyosis uteri seems to indicate some relationship. However, this association is not frequent enough to make one conclude that one factor is responsible for adenomyosis uteri and uterine fibroids.

8. Pelvic inflammation and ovarian cysts occur quite frequently in cases of adenomyosis uteri. However, the conclusion that these conditions are factors in the development of adenomyosis uteri does not seem justifiable.

(The two quotations in the first paragraph of this abstract, from Hofbauer and Dreyfuss, are certainly both incorrect. Hyperplasia is not constantly associated with adenomyosis, and the ectopic endometrium does not always exhibit a picture corresponding to the menstrual phase. It is quite true that hyperplasia is seen in many cases of adenomyosis, sometimes in the surface mucosa as well as in the ectopic islands in the musculature. In such cases there is obviously an ovarian dysfunction, for only this will produce the typical Swiss-cheese hyperplasia of the surface mucosa.)

On the other hand, the surface mucosa may be typically progestational, and yet the deeper lying islands show a hyperplasia pattern, just as an endometrial polyp so often does, even when the surrounding mucosa is progestational. In cases of this sort the ectopic endometrium is of immature type, as is the normal basal, responding only to estrogen but not to progesterone. As a matter of fact, hyperplasia represents only an enormously overgrown basal, with the absence of the functioning layer for which progesterone is chiefly responsible.

Hyperplasia is due to an abnormally persistent estrogenic growth effect, but in adenomyosis something additional occurs, since the endometrium grows downward into the musculature with a benign invasiveness which is often much more marked than the malignant invasiveness of most adenocarcinomas. Why the endometrium thus grows out of its normal bounds no one can say, though it may be a combination of the estrogenic stimulus plus some special sensitivity of certain individual endometria.

One often sees certain transition pictures, since the basal of some endometria is thicker than usual, with deeper indentations of the underlying muscularis. This may well be a precursory stage of genuine adenomyosis, and in the occasional case one may not be able to draw a sharp line. Certainly the difference cannot be stated in millimeters or fractions thereof. In the ordinary case of adenomyosis, however, there is no difficulty in making the diagnosis, since a section at any point of the lesion will show endometrial invasion deep into the uterus, together with islands quite completely cut off from the surface.

If the uterine penetration is deep enough, it reaches the peritoneal surface, giving rise to secondary pelvic endometriosis. Conversely, in cases of external pelvic endometriosis, involving the posterior surface of the uterus, the ectopic endometrium may invade the uterine musculature from without inward, producing a secondary adenomyosis.

(Until the advent of radium, the treatment of adenocarcinoma was purely a surgical problem, and this was fully justified by the relatively large proportion of cures, due to its slower dissemination and the comparative ease and safety of the type of operation indicated. Soon after the replacement of surgery by radiotherapy in the management of cervical cancer, a rather abortive effort at similar replacement of surgery by radium for corporeal cancer was noted, chiefly because of the good results reported by Heyman of Stockholm, but surgery still remained the popular plan. In more recent years, however, radiotherapy has established itself as a valuable adjuvant, since its employment before operation devitalizes and at least partially destroys the lesion, and, moreover, it lessens the hazard of the subsequent panhysterectomy by sterilizing the cancer area.

Scheffey and his group have been among the champions of this plan, advocating intracavitary radium application, followed by operation 6 to 10 weeks later. The indispensability of the hysterectomy is indicated by the fact that residual carcinoma was found in a little over a half of the removed uteri, and this appears to be about the experience in other clinics as well. The more thorough the microscopic examination of the removed uterus, the higher this incidence of residual cancer is likely to be. The excellent results which they report in their series of cases treated in this planned fashion, small though the group is, is eloquent testimony to its effectiveness.

In an even more recent paper by Miller and Henderson (abstracted below), excellent results have been reported with another method of combined therapy, in which x-ray alone instead of radium is used as the agent for the preliminary irradiation. Both of these plans of management seem effective, as is a third plan, in which both radium and x-ray are utilized. It is as yet too early to be sure as to which of these offers the most advantage and the least disadvantage. There can be little question, however, that with a few justifiable exceptions, the patient's best chance for cure lies in preliminary radiation followed after an interval of approximately 6 weeks by the complete operation, and certainly it has been established that the latter is indispensable if the best results are to be obtained.—Ed.)

## CORPUS CARCINOMA; A STUDY OF THREE HUNDRED TWENTY-TWO CASES

N. F. MILLER AND C. W. HENDERSON

*Am. J. Obst. & Gynec.*, 52: 894-903, 1946

During the 14½ years since 1931 the authors' planned program of treatment for corpus carcinoma has been deep x-ray therapy followed later by adequate surgery. During this period of time 322 patients with corpus carcinoma have come under their care, and all of these cases have been followed and carefully studied. Many of the patients were advanced and beyond surgical help; these and others considered excessively poor operative risks were treated entirely by irradiation, usually a combination of x-ray and radium. The methods of treatment used in the care of patients in various categories, together with the respective survival rates, are shown in Table I.

The average age in this series was 54 years. The average time lapse from the onset of symptoms to the beginning of treatment was 12.5 years; apparently there is still great need for cancer education among women of this age group.

The clinical grouping of 301 patients in this series, as shown in Table III,

averaged 4500 to 5000 mg. hr. (screening with 1.5 mm. platinum). Previously the dosage varied from 2400 to 3600 mg. hr. (0.3 mm. silver and 1.0 mm. brass, or 0.5 mm. platinum screening prior to 1937). Fewer complications were noted than in cervical carcinoma with radium therapy.

A group of 37 patients was treated with radium and combined with x-ray therapy, of whom 30 were eligible for 5 year statistics—the survival rate being 36.6 per cent which is definitely lower than the similar numerical group which received radium alone. Two very far advanced cases were treated with x-ray alone, neither of which survived 5 years. X-ray therapy consisted of 25 Ma. at 200 Kv. filtered through 0.5 mm. or 1.0 mm. of copper and 1.0 mm. of aluminum at 50 cm. S. T. D.; ports 16, 19 or 20 cm. square. Two anteriorly and two posteriorly are employed at first, cross firing the uterus and parametrium. Two such areas are treated daily, each receiving 200 r. (measured in air). The treatments are continued until a well marked erythema is obtained, which in general will occur with a total of 1600 to 2400 r. to each portal. Three to four weeks are required to complete the cycle, but if the time is not restricted, and to avoid sickness, the daily r. treatment is reduced and the treatments extended over a longer period of time.

Of a group of 69 cases treated with surgery and radiation combined, the authors chose to break down into three categories: first, those in whom surgery was inadequate or incomplete and accompanied with some form of irradiation in addition, with a 5 year survival rate of 23 per cent; second, those in whom the surgery was adequate and essentially complete, with irradiation in addition, but not employed according to any set plan—survival rate 37.5 per cent; third, that group of patients in whom adequate surgery followed preliminary intrauterine radium applications according to a definitely conceived technique with a 5 year survival rate of 90 per cent.

Inadequate surgery was defined by the authors as anything short of complete hysterectomy with adnexal removal. Errors in judgment and failure to do preliminary curettage in the presence of myomata in the menopausal and post-menopausal patients was responsible for the low survival rate in the inadequate surgery group of cases.

The program of the authors consisting of adequate surgery with preliminary radium (planned technique) has been carried out in their clinic since 1935, although the first patient was treated in this manner in 1932. During the 25 year period of this study a planned technique of preliminary irradiation with 4500 to 5000 mg. hr. is administered, followed by adequate surgery in 6 to 10 weeks. So far postoperative x-ray has not been used since the authors dislike its use because of the unpredictable effect upon the intestinal tract. Residual carcinoma was found in 54.8 per cent of the removed uteri in this group of cases. A 5 year survival rate of 90 per cent among a group of 10 patients, with 20 additional patients among a group of 21 now surviving from 1 to 4 years and without operative mortality, support the writers' contentions that a planned technique of preliminary irradiation with radium followed by adequate surgery is the best method of treatment at this time for management of fundal carcinoma.

use, at least until some other combination or new form of therapy is proved more satisfactory.

The use of very high voltage x-ray as a preoperative measure in corpus carcinoma appears promising and should be further explored. Radium also gives good results but, on the basis of available evidence, the authors do not believe that the merits of preoperative x-ray versus radium can be accurately stated. The authors' interest in deep x-ray as a preoperative measure in corpus carcinoma was entirely with the hope of increasing survival rate.

TABLE IV  
*Histologic grade—301 cases corpus carcinoma*  
(From Miller and Henderson)

TREATMENT	GRADE I		GRADE II		GRADE III		GRADE IV		NOT GRADED	
	Num- ber	Per cent	Num- ber	Per cent	Num- ber	Per cent	Num- ber	Per cent	Num- ber	Per cent
Radium.....	1	2.7	19	51.3	14	37.9	1	2.7	2	5.4
X-ray.....	0	0	9	28.1	16	50.0	2	6.2	5	15.6
Radium and x-ray.....	2	2.2	51	57.3	25	28.0	6	6.6	5	5.5
Surgery.....	2	10.0	14	70.0	4	20.0	0	0	0	0
Radium and surgery.....	2	12.5	9	56.2	3	18.7	1	6.2	1	6.2
X-ray and surgery.....	2	2.0	58	60.4	32	32.2	2	2.0	2	2.0
Radium, x-ray and surgery.	1	9.2	5	45.4	5	45.4	0	0	0	0

(We are now beginning to get returns as to the results of the comparatively recent plan of treating adenocarcinoma of the corpus uteri with panhysterectomy, preceded by preliminary irradiation. The preceding abstract of the paper from Scheffey's clinic presents the results in such a series, in which the irradiation agent which was preferred was radium, while in the present excellent and well-tempered study by Miller and Henderson, the reliance was put upon x-ray alone.

It is too early to reach any final decision as to which is the better plan, and there may prove to be comparatively little difference in the results. Both would seem to be efficacious in clearing up uterine infection and in devitalization though usually incomplete destruction of cancer cells, and the adherents of both plans emphasize the indispensability of hysterectomy in attaining the best results. A third important contribution to this question has just appeared as we go to press (Taylor, H. C., Jr. and Becker, W. F., Surg., Gynec. & Obst., 84: 129, 1947). This will be abstracted and commented upon in the next issue of the Survey.—Ed.)

## ABDOMINAL MENSTRUAL FISTULA

ERNEST M. AMALIA

Bol. Sol. Chile. Obs. y Gin., 11: 20, 1946

Two cases of abdominal menstrual fistula are described. The first was due to a uterine fixation, the second followed a right salphingo-oophorectomy. The first case, 29 year old, had had normal menstruation. A single pregnancy ended

is based on uterine size. Group I presented no palpable enlargement of the uterus, Group II, enlargement up to the size of a 2½-month pregnancy and Group III, enlargement to the size of a 3-month pregnancy or greater.

Histologic grade in endometrial carcinoma is a factor in determining survival rate. Table IV shows the histologic grade in this series.

TABLE I

*Methods of treatment used in the care of 322 patients with corpus carcinoma*

(From Miller and Henderson)

TREATMENT	A		B					
	NUMBER	PER CENT OF TOTAL	SURVIVAL RATES IN PER CENT OF THOSE ELIGIBLE					
			3 year		5 year		10 year	
			Num-ber	Per-cent	Num-ber	Per-cent	Num-ber	Per-cent
None.....	21	6.5						
Radium.....	37	11.4	34	44.1	29	41.3	10	30.0
X-ray.....	32	9.8	30	23.3	22	27.2	6	16.6
X-ray and radium.....	89	27.4	65	33.3	50	28.0	26	23.0
Surgery.....	20	6.2	18	66.6	15	53.3	8	50.8
Radium and surgery.....	16	4.9	14	87.5	13	86.6	9	81.8
X-ray and surgery.....	96	29.5	79	84.7	61	77.0	23	65.0
X-ray, radium and surgery.....	11	3.6	7	70.0	4	66.6	3	60.0

TABLE III

*Clinical grouping of 301 corpus carcinoma cases*

(From Miller and Henderson)

TREATMENT	GROUP I		GROUP II		GROUP III		UNKNOWN	
	Num-ber	Per-cent	Num-ber	Per-cent	Num-ber	Per-cent	Num-ber	Per-cent
Radium.....	6	16.2	24	64.8	7	18.9	0	0
X-ray.....	5	15.6	11	34.2	6	18.7	10	31.2
Radium and x-ray.....	25	28.0	45	50.5	15	16.8	4	4.4
Surgery.....	2	10.0	10	50.0	8	40.0	0	0
Radium and surgery.....	5	31.2	8	50.0	3	28.8	0	0
X-ray and surgery.....	40	41.6	50	52.0	6	6.1	0	0
Radium, x-ray and surgery.....	3	27.2	5	45.6	3	27.2	0	0
Total.....	86		153		48		14	

From the data of this study it appears that preoperative x-ray has proved a valuable adjunct to total hysterectomy and bilateral salpingo-oophorectomy in the treatment of corpus carcinoma. Its use clears up uterine infection, reduces uterine size and decreases pelvic hyperemia, thereby facilitating operation. Preoperative x-ray has not in any discernible way interfered with wound healing. The results obtained from preoperative x-ray warrant its continued

Laparotomy scar endometriosis is not always, nor most frequently, continuous with either the uterine or tubal mucosa, and it is rather exceptional for it to be associated with an actual menstrual fistula. For that matter many cases of abdominal scar endometriosis have been observed where neither the uterine nor the tubal lumina have been opened. This has been one of the many points around which has revolved the discussion of the etiology of endometriosis, but that is a story in itself, and a long one, not yet concluded.

It should be remembered that endometrial growths in laparotomy scars, even if they have no communication with the tubo-uterine canal, may, like umbilical endometriosis, break through the skin and cause slight bleeding at the menstrual periods. One must therefore distinguish such an occurrence from the bleeding associated with a genuine menstrual fistula. More often endometriosis of laparotomy scars is characterized by periodic swelling, tenderness and pain, but not by external bleeding.—Ed.)

at 4 months by spontaneous abortion without complications. After 4 years of secondary sterility she was operated upon for retroflexion of uterus, and ventral fixation of the uterus was done, with appendectomy and extirpation of a cyst of the left ovary. She complained of an unhealed abdominal scar, through which blood was discharged at menstruation. She was obese, with a long abdominal scar having a circular orifice a half centimeter in diameter, through which pus oozed. The fistula was confirmed by injection of colored water which was eliminated through the vagina. Vulva, vagina and uterus were otherwise normal. The cervix was dilated and laparotomy performed to permit resection of the uterine wall. The abdominal wall and fistula orifice were closed with a tubular drainage. Complete healing of scar followed and the patient on later observation, was in good condition.

The second case, 36 years old, had developed a uterine fistula after an operation 7 months previously. This comprised right salpingo-oophorectomy and appendectomy, with a drainage tube in the incision. Menstrual blood escaped through an opening in the scar and on admission the patient also complained of hypogastric distress and pain in the left iliac fossa. Menstrual history had been negative till the operation. On examination a small orifice was noted in the scar, through which a purulent serum oozed. Genitals were normal and palpation disclosed the normal size and position of the uterus. Radiogram disclosed anterior left lateral version of uterus and a fistula on the right side. A laparotomy repaired the old scar, and included left salpingectomy and partial oophorectomy. The fistula was removed and the uterine wall resected. Sulfanilamide was given intraperitoneally. Recovery was satisfactory and a later check indicated cure of the fistula.

Such uterine fistulas may follow various types of abdominal intervention: caesarean section, partial hysterectomy or myomectomy. They may also occur with ectopic pregnancy. Menstrual blood may undergo reflux through the tubes into the peritoneum, especially if the uterine canal is constricted or obstructed. There have also been cases of utero-intestinal and uterovesical menstrual fistulas. The chief cause is likely to be faulty and septic surgical technique, and secondary infection of sutures producing abscesses which rupture spontaneously into the outer wall. Treatment may include extirpation of fistula and repair of the uterine and abdominal walls; or if this is too complicated, hysterectomy must be done.

(It is unfortunate that no histological study of the menstrual fistulous tracts is reported in this abstract, especially as to the presence or absence of endometrial tissue. As the author states, such fistulas communicate with the uterus or, more often, with the stump of an amputated tube. Even when there is no actual fistula, endometrium will often proliferate from the tubal stump and may actually be continuous with endometriosis of the laparotomy scar. The very last paper published by the late lamented John A. Sampson, whose "discovery" of endometriosis as an important clinical and pathological entity was one of the most important contributions in gynecology during our generation, was devoted to this very subject. In this paper (*Pathogenesis of Postsalpingectomy Endometriosis*, *Am. J. Obst. & Gynec.*, 50: 1, 1945) he studied 17 such cases with his characteristic thoroughness.



showed marked physiologic involution, and similar findings were reported by Pich.

Retardation of skeletal development has been observed. In the present case the height was within average range and the epiphyses were closed.

Except for the variable presence of pubic and axillary hair, the secondary sex characteristics have been absent in adults.

While no coincidental minor congenital abnormalities were present in the writers' case, with the possible exception of the sclerosed left kidney, these have been observed.

The occurrence of bilateral ovarian aplasia supports the view that the establishment and differentiation of the specific characters of the gonad and duct system which determine the sex of the individual are largely under genetic control. It is suggested that in cases of unilateral absence of the ovary there is a failure of normal development of the genital ridge of tissue as such, while in cases of bilateral defect it is only that portion which requires the presence of the primordial germ cells that fails to develop normally. 6 figures.

## GONOCYTOMA

### HOMOLOGOUS OVARIAN AND TESTICULAR TUMORS. I

With Discussion of "*Mesonephroma ovarii*" (Schiller: *Am. J. Cancer*, 1939)

GUNNAR TEILUM

*Acta path. et microbiol. Scandinav.*, 23: 242-251, 1946

In 1943 the author set up a homologous tumor series (the "seminoma series") in the testis and ovary after demonstration of the homology (with total morphological congruence) of an ovarian tumor, previously misinterpreted by Schiller as mesonephroma, and papillo-endothelioma—and a most often adenopapilliferous, solid or cystic, possibly teratoid testicular tumor. On the basis of their relation to seminoma and chorionepithelioma, and their clinical and hormonal aspects, the writer has now classified these testicular and ovarian tumors as an intermediate form between seminoma (dysgerminoma) and chorionepithelioma, designating the tumor as "the intermediate form of the seminoma series".

Schiller has described 10 cases of solid or cystic tumor under the designation of "*mesonephroma ovarii*". Histologically, these tumors were characterized by the occurrence of more or less pronounced glomerular structures which he interpreted as abortive glomeruli originating from the Wolffian body or mesonephros. Kazancigil, Laqueur and Ladewig have described 3 cases of the same tumor, but designated it as "*papillo-endothelioma ovarii*", objecting to Schiller's theory about its development from mesonephric tissue. The author has picked out a number of histological features from 4 malignant testicular tumors which,

## THE ADNEXA

### BILATERAL OVARIAN APLASIA

C. A. ERSKINE AND I. RANNIE

Arch. Path., 42: 381-390, 1946

A case of bilateral ovarian aplasia is reported, compared with the other recorded cases and discussed in the light of modern theories of sex determination and development.

A 35 year old woman was admitted with a complaint of painful swelling of the left leg and buttock of 7 days' duration. She had never menstruated. On admission she showed an edematous, reddened left leg and a swollen doughy abdomen. There was complete absence of secondary sexual characteristics.

Roentgen examination of the lungs showed evidence suggestive of tuberculosis. The radiologist reported that the sella turcica was small. The red blood cell count was 3,200,000 and the hemoglobin 54 per cent. The patient died before estimation of 17-ketosteroid excretion could be carried out.

At autopsy no pubic nor axillary hair was observed, and the vulva showed only scanty hair. The breasts were not developed beyond the infantile stage.

Recent tuberculous lesions were present in the upper lobe of the left lung. There was caseous tuberculous lymphadenitis, a chronic tuberculous ulcer of the ascending colon and recent tuberculous peritonitis.

The kidneys were unequal in size, the right weighing 126 gm. and the left 54 gm., and the left renal artery bifurcated 1.5 cm. from its origin.

The external genitalia were definitely female, but were not developed beyond the prepubertal stage. The uterus was infantile and the uterine tubes appeared thin and underdeveloped. No ovaries were discovered and no ovarian tissue was found in the usual ectopic sites.

Histologic examination of the uterine tubes revealed no ovarian tissue, cortical or medullary, in any of the blocks of tissue. Each tube was the site of recent tuberculosis but there was no evidence of older tuberculosis or of other pathologic processes which might have destroyed the ovaries.

The findings in this case and in all the recorded cases show a close similarity. Ovarian tissue has been absent from the usual position and none has been found in ectopic sites. In adults the internal genitalia have been underdeveloped and might well be called infantile. The condition of the structures found in the mesosalpinx and mesovarium has varied. In the present case no paroophoron was found; the tubules of the epoophoron were numerous and in appearance resembled the structure of an epididymis. Interstitial cells were present, embedded in a connective tissue stroma.

There have been no constant abnormal findings in the other endocrine organs. In the present case no abnormality was noted in the pituitary gland; the thymus

In connection with the critical evaluation of the term "mesonephroma ovarii", the author describes a case of malignant ovarian tumor which, in contrast to the tumor form described by Schiller, must be looked upon as a true mesonephroma. The origin of this particular tumor from persistent remnants of the mesonephros is indicated by the following features:

1. Early occurrence of a retroperitoneal tumor on the opposite side of similar macroscopic and microscopic features.
2. Histological structure of the tumor, with dichotomic branching of the tubules, together with ampulla-like distensions and cyst formations.
3. Type of epithelium (partly ciliated epithelium with the nuclei situated at different levels; often large clear cells in the proliferations.)

(This is not an easy article to abstract, and the original paper cannot be put in the class of light literature. The author's thesis is apparently to establish a relation and gradation between dysgerminoma, the tumor called mesonephroma by Schiller, and chorionepithelioma. Most pathologists will agree with him that the evidence for the mesonephric origin of the so-called mesonephroma is far from convincing, and the illustrations accompanying this paper do strongly suggest a similarity and possibly even identity of certain tumors of this type with certain malignant testicular tumors. But beyond this the author's arguments seem rather labored, such as his assumption of an origin of chorionepithelioma from a testicular anlage. At the other end of the series, he speaks of the not infrequent differentiation of tubular formation in seminoma, but this is certainly not a common observation. It is true that in infiltrating and degenerating portions of such tumors cords and even pseudotubules may be seen, but not clearly defined tubules such as those seen in many arrhenoblastomas.

As to the case of true mesonephroma which he describes, his pathologic description and the photomicrographs would incline me to agree with him in his interpretation, and in believing that his tumor is much better entitled to the designation of mesonephroma than the group described by Schiller, and to which the same designation was rather prematurely applied.—Ed.)

## ARRHENOBLASTOMA—ANDROBLASTOMA

### HOMOLOGOUS OVARIAN AND TESTICULAR TUMORS. II

Including the so-called "Luteomas" and "Adrenal Tumors" of the Ovary and the Interstitial Cell Tumors of the Testis

GUNNAR TEILUM

*Acta path. et microbiol. Scandinav.*, 23: 252-264, 1946

In this paper the author discusses a second series of homologous tumors of the ovary and testis, the arrhenoblastoma series. A case of feminizing testicular tumor is described which shows complete morphological congruity with the virilizing arrhenoblastoma of the ovary described by Robert Meyer. According to Meyer, the arrhenoblastoma originates from testicular elements remaining from early stages of the gonadogenesis. He demonstrated the connection be-

in view of the ovarian tumors described by Schiller and by Kazancigil, Laqueur and Ladewig, prove that here one is dealing with the same tumor form in the testis and ovary. The histological features of the testicular tumors which made them similar to these ovarian tumors are briefly as follows:

Case I. In the cells lining the capillary tufts it was sufficiently extensive to produce a configuration resembling perithelioma.

Case II. Irregular tubules with columnar epithelium, tumor parenchyma consisting of small cysts lined by endothelial-like cells, papillary and cystic tumor, tumor parenchyma consisting of small cysts and glomerular formations, glandular ring-shaped structure.

Case III. System of cavities lined with polymorphous cells.

Case IV. Glomerular structure.

Thus, the author concludes that one is here dealing with a tumor form which, in spite of its often variegated histological features, in all details presents the same structure in the ovary as in the testis. The morphological congruity of these tumor forms in the ovary and testis, with the demonstrated relationship between various forms of differentiation within the individual tumor series, constitutes the basis for the following histogenetic classification of the testicular and "testicular" ovarian tumors.

*Homologous tumors of the dysgerminoma (seminoma) series: gonocytoma*

	OVARY	TESTIS	SECRETION OF CHORIONIC GONADOTROPHIN
Gonocytoma I	Dysgerminoma	Seminoma	0
Gonocytoma II	Intermediate form adenopapilliferous or cystic ovarian                      testicular		(+)
Gonocytoma III	Chorionepithelioma (Chorioma) ovarian                      testicular		++

In this tumor series the seminoma is looked upon as an undifferentiated fundamental type, the relation of which to the other forms is evident not only from the combinations described in the testis and ovary and the not infrequent differentiation of tubular formation in seminoma tissue, but also from the output of chorionic gonadotrophin that has been demonstrated in a few instances. These tumors of the seminoma series (gonocytoma) are taken to arise from the early stages of germ cells in the testis or persistent remnants of the medullary cords in the ovary. Chorionepitheliomatous proliferations, in the ovary as in the testis, and also when they occur together with the polycystic testis teratoma, have their origin in testicular anlage, the dominance of which in the male gonads results in the greater frequency of these tumors in the testis than in the ovary, and this applies to all 3 tumor forms: seminoma, intermediate form and chorionepithelioma.

Further, a gradual transition is demonstrated from tumor tissue of androblastoma type to clear-cut "lipoid cell tumor" which shows morphological congruity with the virilizing, markedly lipoid-containing ovarian tumors generally described as "luteoma", "adrenal tumor", "ovarian hypernephroma" and "folliculome lipidique". Accordingly, such ovarian tumors are now to be looked upon as a particularly lipoidal form of ovarian arrhenoblastoma.

In addition, diffuse forms of tumors containing no lipoid occur both in the ovary and in the testis. These tumors are to be looked upon as variants within the arrhenoblastoma series and, like the other forms mentioned, may have a relative virilizing and feminizing effect. These tumors show more or less pronounced differentiation in the direction of testicular interstitial-cell tumor and a homologous "extraglandular" interstitial-cell tumor of the ovary.

The demonstrated homologous tumor series—respectively the seminoma (dysgerminoma) = gonocytoma, discussed in Part I of this publication, and androblastoma (arrhenoblastoma) series—that may be encountered in the testis as well as in the ovary in all forms of differentiation, are set up as the basis for a classification comprising both the tumors of the testis and the "testicular" tumors of the ovary. This further affords a far more clear-cut morphological differentiation of such ovarian tumors from other particular forms of tumors, *e.g.*, the granulosa cell tumors.

The peculiar fact that a tumor which is virilizing in women may have a feminizing effect in men corresponds to findings described concerning tumors of the adrenal cortex. 14 figures.

## ARRHENOBLASTOMA OF THE OVARY WITH A REPORT OF TWO CASES

GEORGIANNA SEEGER JONES AND HOUSTON S. EVERETT

*Am. J. Obst. & Gynec.*, 52: 614-622, 1946

Two patients with arrhenoblastoma of the ovary were recently studied at the Johns Hopkins Hospital and were deemed worthy of reporting because of their rarity and the paucity of 17-ketosteroid determinations on such cases. Case 1 was a 36 year old white married woman with little evidence of masculinization except for considerable hirsutism and rather marked muscular development; symptoms which had persisted over a period of 16 years. Complete amenorrhea had been present for a period of 8 months and this seemed to be the only symptom associated with the tumor which she was known to have for at least a year. At operation the right ovary was replaced by a solid tumor 9 cm. in diameter. The surface of the tumor was grossly corrugated and a purplish brown color. The uterus, cervix, both tubes and left ovary which were normal, were removed with

tween various types of differentiation of this tumor—the testicular adenoma of the ovary, the solid form, and “Mittelklasse” which covers the combination of tubular and solid parts. Meyer believes that the 3 forms are to be regarded as different degrees of maturity in the same kind of tumor. He assumes that the arrhenoblastoma originates from undifferentiated germ-cells that have retained their germinal potency through the period of development. Although Meyer’s views are widely accepted, some writers have objected to them, and it is felt by the author that the demonstration of corresponding tumors in the testis will be of decisive importance in elucidating the subject.

A 53 year old man was admitted complaining of swelling of the left half of the scrotum for the past 30 years which had increased further during the last couple of years, a gradually increasing gynecomastia, decreased libido and impotence. Both mammae were diffusely enlarged with a well-developed corpus mammae and a feminine pattern of the nipple. There was no hair on the chest. The left testis was transformed into a firm, smooth, freely movable tumor, about the size of a goose egg. The right testis was atrophic and soft.

Surgery was performed, and as malignancy could not be excluded histologically, x-ray treatment was instituted. Following removal of the tumor the mammae decreased in size and the gynecomastia began to subside. Three days after operation hormonal analysis showed: gonadotrophin, 50 M. U., estrogenic hormones, 50 M.U., and androgenic hormones, 6 I.U. daily. The respective findings 8 months after operation were: 50 M.U.,  $>20 < 50$  M.U., and 13 I.U. daily.

On cut surface the tumor was intensely yellow in color and showed a fine lobular configuration with yellow nodules, delimited by net-formed streaks of connective tissue. Histologically, the structure of the tumor at first appeared exceedingly variable, rich in cells showing differentiation of solid cords and tubules. On closer examination it was found that these different parts of the tumor could be interpreted as stages of differentiation within a diffuse tumor blastema. The tissue was divided into small fields by a finer or coarser fibrous stroma. In its diffuse, cell-rich, sarcoma-like parts, the tumor tissue was composed of closely packed, elongated or polygonal cells, small dark cells with scanty protoplasm being mixed with light vesicular cells with abundant protoplasm, often differentiated into light streaks; and again transitions were seen from these light streaks to entirely tubular parts, corresponding to the pictures most characteristic of ovarian arrhenoblastoma. The dense dark cells showed further differentiation, forming epithelial cords in edematous stroma or irregular tubules with dark columnar epithelium remind of rete canals. All these characteristics show complete congruity with all stages of differentiation in the typical virilizing arrhenoblastoma of the ovary. A considerable lipoid content of the tumor was demonstrated by staining with osmic acid and Sudan 3.

Thus, previously established testicular androblastoma (homologous with Meyer’s arrhenoblastoma of the ovary) is extended to include also hormone-producing tumors showing all the differentiating stages known from the arrhenoblastoma. The hitherto unknown occurrence of this form of tumor in the testis demonstrates the correctness of Meyer’s view concerning arrhenoblastoma of the ovary.

The menses had been normal, the last period having begun 12 days before admission. The patient weighed 240 pounds. Physical examination revealed slight tenderness in both vaginal vaults and a large firm mass was palpated in the right vault. Motion of the cervix did not cause pain. The temperature was 101 degrees F., pulse 96, blood pressure 120/80 and the white cell count 8600 (rising to 10,800 on fourth hospital day). X-ray revealed a questionable soft-tissue mass in the pelvis. Operation was performed on the fourth day.

Differential diagnosis is considered in respect to the urinary tract, gastrointestinal tract and internal female genitalia. The urinary tract may be dismissed because of the lack of urinary symptoms. The progress of the symptoms suggests a sudden rupture or extension of a long-standing process in the lower abdomen. The absence of peritoneal infection, the patient's age and the absence of previous bowel disturbance are not typical of various gastrointestinal conditions. In regard to the internal female genitalia, extrauterine pregnancy must first be considered, in spite of the normal menstrual history. Dr. Miller's diagnosis was ruptured ovarian cyst, with hemoperitoneum and hematoma of adnexa. The pathological diagnosis of the mass removed at operation was dermoid cyst of the left ovary, with twisted pedicle. A moderate amount of orange-colored fluid was found free in the peritoneal cavity. The ovarian cyst had not ruptured.

## SOLID TERATOMAS OF THE OVARY WITH NEUROLOGICAL METASTASES

G. G. PROSKAUER

Am. J. Obst. & Gynec., 52: 845-849, 1946

If malignant changes occur in solid teratomas of the ovary, they are seen almost exclusively in elements of the nervous tissue. Only 10 such cases have been reported in the literature. Because of this rarity a new case is presented, that of a 22 year old woman who complained of abdominal swelling and pain of 4 months' duration. At operation she was found to have a simple dermoid cyst (cystic teratoma) of the left ovary and a solid teratoma of the right ovary with metastatic implants on the peritoneum.

These tumors occur anywhere from 11 to 38 years, are predominantly unilateral, are always large, have an associated ascites, metastasize by implantation exclusively and appear as multiple nodules on the parietal and visceral peritoneum and omentum. Histologically, these metastases are almost always pure neuroglial tissue. The primary tumor may be highly developed with various types of mature ganglion cells, at times in layers with remnants of meninges, gyrus formation and cerebellar cortex. If the neuroglial metastatic tissue appears mature it may degenerate and disappear after extirpation of the primary tumor. If the tissue is immature (cellular) recurrences or death may ensue.

the right ovary. Microscopically the tumor was composed almost entirely of well differentiated tubular elements.

The second case occurred in a 26 year old white married woman with a rather acute onset of symptoms progressing over a 3 year period. Masculinization was definite including hirsutism, hoarseness, and enlargement of the clitoris. Amenorrhea was also present. The urinary output of 17-ketosteroids was 56 and 36 mg. per 24 hours on two different days preoperatively. Twelve days postoperatively the level had fallen to 11 mg. per 24 hours which is within the normal range. The microscopic appearance of this tumor was quite different from that of the first case, as it consisted almost entirely of interstitial cell elements with very occasional tubule formation. The predominance of interstitial cells in the tumor correlates well with the clinical findings of virilism and elevated 17-ketosteroids. The patient had a simple salpingo-oophorectomy and when last seen 10 months postoperatively she was menstruating regularly and the enlargement of the clitoris had regressed. There has been no improvement in the hirsutism or voice pitch.

It is an interesting pathologic observation that the arrhenoblastoma like the dysgerminoma shows a predilection for the right ovary. This is in keeping with the theory of its origin from the embryonic cell rests, as the right ovary develops more slowly and less completely both embryologically and phylogenetically, the right ovary in birds being almost entirely absent.

(The photomicrographs accompanying this paper show the typical picture of arrhenoblastoma, if one can speak of any picture as typical in a lesion presenting such very wide histological variations and gradations as this tumor does. The history of the first case is of interest in that hirsutism had been present for 16 years, while the amenorrhea, ordinarily the very first symptom noted by the patient, had been present for only 8 months. This suggests that the hirsutism was not due to the ovarian tumor, but that it was of the more common type due to some chromosomal or genic imbalance. The hirsutism of such cases ordinarily manifests itself at or shortly after puberty. That of arrhenoblastoma ordinarily occurs somewhat more abruptly in previously normal patients, and is commonly preceded by amenorrhea. The history of the second patient is somewhat more typical.—Ed.)

## DERMOID CYST OF LEFT OVARY, WITH TWISTED PEDICLE

T. B. MALLORY, B. CASTLEMAN AND M. D. SCHULZ

New England J. Med., 235: 728-730, 1946

Eight days prior to hospital admission the patient, a 30 year old woman, was seized with sharp intermittent pain in the left lower quadrant, flank, and thigh. She was unable to move her bowels, and 2 enemas were administered and three tablespoons of milk of magnesia were taken. Two days later an enema initiated a diarrhea that lasted 4 days. The abdominal pain continued; at the time of admission it was reduced to a dull ache in the left flank and over the symphysis. Hospitalization was advised because of a continued fever.



In 69 of the 135 cases the endometriosis was associated with other pelvic lesions, which made proper clinical evaluation more difficult. In 43 cases the associated lesion was fibroids, and there were 2 cases of carcinoma of the ovary.

Both ovaries were involved in 77 cases, and one ovary in 37. The affinity for the ovaries and the far advanced nature of the pelvic pathology account in part for the fact that surgical castration was necessary for complete cure in 66 per cent of the cases.

It is concluded that meticulous care in eliciting symptoms, proper correlation of them with the menstrual flow and accurate interpretation in terms of the pelvic findings are essential to diagnosis. It is stressed that the interrelationship of diagnosis to treatment in endometriosis is of unusual importance in young women, either because of the desire for pregnancy or sentiment toward the total loss of both ovaries.

(One does not necessarily have to agree with the author's statement that the classical clinical entity of endometriosis is rare to concede that there are many exceptions to the clinical characteristics as usually described. For example, dysmenorrhea of increasing severity is often stressed as a significant symptom, and there are some who seem to think that this justifies a presumptive diagnosis of endometriosis even though palpatory findings are negative. But dysmenorrhea is often moderate or absent, although I do not think that many will believe that its incidence is as low as that reported by Abell, who found it in only 18 of 135 cases.

This low incidence is all the more surprising since such a large proportion of his cases are said to have been of advanced type, with bilateral involvement of the ovaries. In at least some of these cases, the dysmenorrhea is apt to be referred to the rectum or the lower sacral or coccygeal region, because of the presence of uterosacral lesions. These must have been present in a good many of the advanced cases of Abell's group, although this is not noted by the author. It is in this group that one can usually make a correct preoperative diagnosis, since the uterosacral involvement is manifested by the presence of one, or at times a cluster, of nodules in the uterosacral ligaments, readily palpable on pelvic examination. Indeed, except for this sign, and the characteristic radiation of the menstrual pain in such cases, the symptomatology of endometriosis does not differ from that seen in chronic pelvic inflammatory disease. Nor do the pelvic findings, which in either case are likely to show an enlarged and adherent ovary.

Just as difficult to explain in a series of cases including so many of fairly advanced type is the low incidence, 23 of 135 cases, of involuntary sterility. The general experience, and certainly my own, is that endometriosis of even moderate extent imposes a much higher degree of relative infertility, even though the tubes are patent, as they characteristically are. The explanation of this common observation is not clear.

It is unfair to comment on the author's figure of 66 per cent as representing the proportion of complete castration that was done unless the age incidence and social status of this radically treated group were known. There would be no criticism of the radical plan with extensive endometriosis in women approaching middle life, but, since he says that the ages in his series were fairly evenly distributed throughout menstrual life, one gets the impression that his surgical policy is somewhat more radical than that of most gynecologists.—Ed.)

REMOVAL OF LARGE OVARIAN TUMOR COMPLICATED BY  
CARDIAC FAILURE

A. F. FOWLER

Brit. M. J., 2: 578, 1946

The interest in this case lies in the size of the ovarian tumor and in the rapid recovery of a failing heart as soon as the pressure upon it was released. The tumor was a typical pseudomucinous cystadenoma weighing 41 pounds. Prior to operation it completely filled the pelvis and abdominal cavity. On admission, the patient, a 50 year old woman, was found to be thin, dyspneic and slightly cyanotic. The cervical veins were full. Cardiac dullness was increased to the right, and the interval between the first and second apical sounds was increased. Both lower limbs were edematous and the abdomen was grossly distended. Following removal of the ovarian tumor the patient made a rapid and uneventful recovery, and was discharged one month later in good health.

(In this case, the large tumor seems to have produced much more effect upon heart action than is usual with even very large growths, though some degree of both circulatory and respiratory embarrassment is often seen. Evidently there was no intrinsic heart disease. Even when there is, tolerance for pelvic surgery is as a rule surprisingly good, ether being probably the best anesthetic for the more extensive procedures.—Ed.)

## ENDOMETRIOSIS

IRVIN ABELL, JR.

Kentucky M. J., 44: 339-341, 1946

The writer finds that, in his experience, the classical clinical entity of endometriosis is rarely encountered. In a series of 135 consecutive cases of endometriosis, in which the diagnosis was confirmed by microscopic study, the patients' ages were fairly evenly distributed throughout the years of menstrual activity, the highest incidence being in the fourth decade. Of the 89 married women 44, or 55 per cent, were childless, and of these 44 some 23 stated that they were unable to become pregnant. Menstrual disturbances were uncommon; there were 18 cases of acquired dysmenorrhea, 5 of menorrhagia and 3 of metrorrhagia. Pain was entirely absent in 47 cases. Generalized pelvic tenderness was present in 11, localized pelvic tenderness in 23, discomfort only during periods in 49 and sudden acute pain in 6. Twenty-five patients were symptomless, 11 coming for physical examinations and 14 because of abdominal enlargement. When in a series of 135 proved cases, dysmenorrhea occurs but 18 times, primary sterility but 23 and characteristic pelvic pain but 22, it is clear that no code for identification exists.

CLINICAL AND PATHOLOGIC ASPECTS OF PRIMARY SARCOMA  
OF THE UTERINE TUBE

L. C. SCHEFFEY, W. R. LANG AND F. B. NUGENT

Am. J. Obst. &amp; Gynec., 52: 904-916, 1946

The authors' purpose in presenting this paper is first, to record an unusual pathologic entity and to review the literature in respect to it, and second, to discuss the symptomatology, physical findings and the difficulties met with in making an accurate preoperative diagnosis.

A 70 year old woman, para i, gravida i, was admitted to the hospital complaining of low pelvic pain and sensitivity, with intermittent vaginal discharge, sometimes bloody. A year previously the patient had had a sudden hemorrhage following which diagnostic curettage had been performed and an intrauterine application of 1200 mg. hr. of radium administered. Microscopic examination of the curettings revealed no evidence of malignancy; the diagnosis was atrophic endometrium. Intermittent bloody vaginal discharge continued and the patient experienced a "bloated feeling" in the abdomen and difficulty with urination.

On the present admission the fundus was thought to be enlarged; the adnexal areas could not be distinguished from it. Extreme sensitivity was evidence on attempting mobilization. A tentative diagnosis of pyometra following radium therapy was entertained and surgery recommended. Preoperatively a vaginal smear showed atypical cells, suggestive of fundal carcinoma.

Operation revealed what appeared to be a left pyosalpinx, occupying the cul-de-sac and adherent to a small atrophic uterus, displaced anteriorly. The left ovary was atrophic and adherent, and partial torsion of the tubo-ovarian enlargement was apparent. The right tube was hyperemic and swollen, the right ovary atrophic and adherent and the entire right adnexal enlargement firmly attached to the posterior layer of the broad ligament and infundibulopelvic ligament. There was no gross evidence of peritoneal implants or of regional nodal enlargements. Complete hysterectomy with bilateral salpingo-oophorectomy was performed. The patient recovered uneventfully.

The pathologic diagnosis was atrophic endometrium; senile uterus; normal cervix with senile changes; senile changes of both ovaries; senile changes of right tube; and myosarcoma of left tube. The diagnosis of myosarcoma of the left uterine tube was confirmed by Drs. Robert T. Frank and Emil Novak. The patient, now 72 years of age, presents no evidence of recurrent disease.

A summary is presented of the 21 previously recorded cases of primary sarcoma of the uterine tube. From a study of these and the present case, certain observations may be made. The age incidence is similar to that for fundal carcinoma and tubal carcinoma, varying from 40 to 70 years with the exception of 2 patients aged 27 and 37 years, respectively. Symptomatology is in no wise distinctive but is akin to that of tubal or ovarian carcinoma in some forms. Vaginal bleeding is not nearly as well-marked as in uterine carcinoma; this

## CONSERVATIVE SURGERY IN ENDOMETRIOSIS

C. T. BEECHAM

Am. J. Obst. &amp; Gynec., 52: 707-715, 1946

The majority of gynecologists believe that conservative surgery is indicated in the treatment of endometriosis. What constitutes conservatism is difficult to define because of the great variations surgeons place upon the importance of ovarian function and childbearing capacity. To the author conservative gynecologic surgery means removal of the least possible tissue to obtain the desired result.

Eighty consecutive cases treated over the past 6 years are reviewed. Seventy-five of these were operated upon. Ovarian lesions were arbitrarily divided into slight, moderate and advanced. Early or slight lesions were simply excised and the ovary repaired. In moderate lesions (5-6 cm. ovarian diameter) the ovary was removed from the adhesive bed and opened like an oyster shell, following which the endometrial tissue was removed and the ovary repaired.

The association of retrodisplacement and endometriosis is quite impressive. In this series a high incidence of 42.5 per cent of retrodisplacement was noted. This suggests that regular examinations be carried out for signs of fixation of the retrodisplaced uterus and, if present, surgery be employed for probable endometriosis. The average age of these 34 patients with associated retrodisplacement was 35.5 years. Their chief complaints were dysmenorrhea and dyspareunia with or without menometrorrhagia. Surgery in all these cases was considered to be radical although uterine suspension was the conservative operation used when possible.

There were 46 cases or 57.5 per cent of the series of 80 cases that had a normally placed uterus. Thirteen cases were associated with myoma uteri. The average age was 43 and hence conservative treatment not greatly indicated. Ovarian tissue was salvaged in 46 per cent. In 15 cases of associated adenomyosis the treatment was radical and the salvage 66 per cent. Surgery in the remainder of the group must be considered radical.

In the entire series 23 per cent were 45 years of age or older. Their treatment was radical although ovaries were salvaged in 3 cases. Seventy-six per cent were under 45 years of age. They constituted the main problem. Ovarian tissue was salvaged in 23 per cent. Childbearing capacity was retained in 52 per cent. About 75 per cent were treated by conservative surgery. A large share of the conservative treatment was possible through correction of a retrodisplaced uterus. The outstanding feature of the failure of conservative surgery was unremitting pain.

cystic degenerated areas, the author suggests that these cell balls and cysts seen so often in the wall of the tubes may arise from misplaced lower urinary tract epithelium.

A case of primary papillary transitional cell carcinoma of the uterine tube is recorded. The origin appeared to be the transitional epithelial cell balls in the wall of the tube. A second carcinoma involving both the tube and the ovary is described. This tumor consisted of both transitional epithelial features and glandular structures. While a diagnosis of primary adenocarcinoma of the ovary with marked anaplasia cannot be ruled out completely, the writer believes it might be possible that this tumor arose from transitional cell balls of the tubal wall. 12 figures.

(In spite of the photomicrographs accompanying this interesting study, it is rather difficult to form a clear opinion on the subject unless one could sit down at a microscope and study many sections of the lesions described. It is quite possible that the author is correct in his view that the perisalpingeal cysts which he describes arise from misplaced lower urinary tract epithelium. When he read his paper, which I had the pleasure of hearing, I had the feeling that some, at least, of these lesions could be better explained as derived from the Walthard cell nests, sometimes appearing as solid plaques and sometimes glandular in character, which are not infrequently found on the surface of the tube. and less often on or just below the surface of the ovary.—Ed.)

symptom is more likely to be in the nature of a watery, blood-tinged discharge. Pain is probably the most constant symptom, often associated with gastrointestinal annoyance. As to physical signs, the only early sign that one can expect to find is the presence of an adnexal mass. Later, abdominal distention, ascites and an extensive pelvic mass are found, with emaciation and cachexia.

In none of the cases was a preoperative diagnosis of tubal malignancy entertained. Seventeen of the 21 previously recorded cases received surgery; 4 were autopsy findings. There were 9 operative recoveries, of whom 4 were living and well 2 to 12 months after operation. There were 5 postoperative deaths, and 3 remote deaths from metastases.

The appropriate operative procedure is complete abdominal hysterectomy with bilateral salpingo-oöphorectomy. Postoperative irradiation is indicated when operation has been incomplete.

It is evident that the prognosis of tubal sarcoma is doubtful at best. Curability depends on early diagnosis and prompt treatment, which is possible only by a keen appreciation of the symptoms and findings stressed, and by periodical pelvic examination. 5 figures.

(Primary sarcoma of the tube is, as the authors state, an extremely rare lesion. They have performed a valuable service in collecting all the previously reported cases, and this will make much easier the work of subsequent writers on the subject.—Ed.)

## ON THE ORIGIN OF CERTAIN PERISALPINGEAL CYSTS

R. A. REIS

*Am. J. Obst. & Gynec.*, 52: 964-974, 1946

Isolated accumulations of cellular elements forming small clumps or balls are frequently found in the wall of the uterine tubes. For purposes of the present study, 10 apparently normal uterine tubes were cut into several blocks and many random sections taken. Six tubes contained these cell balls. The cell balls consist of transitional cells and very closely resemble morphologically those described by Limbeck and Brunn in the urinary tract.

The cells forming the inner walls of such cystic, degenerated areas assume cuboidal shape, while the cells situated peripherally remain transitional in character. Saphir and Kurland have traced the origin of adenocarcinomas in the urinary bladder back to these cystic, degenerated cell balls. Changes similar to those occurring within the cell balls in the urinary tract have been observed in the cell balls located in the wall of the tubes, including the change into cuboidal cells. Because of the resemblance of these cell balls to those described by Limbeck and Brunn, because of the close resemblance of the individual cells of these nests to the transitional cells lining the urinary tract, and because of the similarity in morphologic alteration of the cells lining the

in 80 per cent of the present series. The author believes that in most cases the primary acute infection reaches the urethra as a direct ascending infection from the vulva, and that there is no reason for blaming septic foci in distant organs.

The etiology of pyelonephritis is discussed, with reference to bacteremia, ascending infection up the lumen of the ureter, and ascending infection via the peri-ureteric areolar tissue or lymphatics. In regard to the last theory, several years ago Winsbury-White showed that Indian ink particles injected into the base of the bladder were eventually found in the hilum of the kidney. The writer believes that peri-ureteritis is a definite clinical entity, closely related to urethro-trigonitis. Although actual proof is lacking, the theory of ascending infection has as much, if not more, clinical evidence in its favor than any other theory.

Of the 246 pyelitis cases there was proof of some urinary tract pathology in 50 per cent of the non-pregnant and in 52 per cent of the pregnant women. There was urethroscopic evidence of urethro-trigonitis in 58.5 per cent of the pyelitis cases, and at least 54 per cent of them had this urethro-trigonitis before the onset of pyelitis. There were 14 cases of honeymoon pyelitis, and in every case the primary infection was undoubtedly in the urethra. The author suggests that pyelitis is seldom a primary disease, but that it is merely a dramatic incident in the course of generalized urinary infection.

(Chronic trigonitis is an extremely common condition, but it is in a large proportion of cases secondary to lesions higher up in the urinary tract, such as chronic pyelitis and ureter stricture. In such cases the trigone is reddened and granular, but it is at least questionable whether such pedunculated or sessile polyps as the author describes can be explained on a purely inflammatory basis. What has been said as to the chronic phase of trigonitis would seem to apply also, and perhaps more strongly, to the acute type which he describes, and which he says is often followed by acute pyelitis. He obviously is a strong believer in the theory of ascending infection, although the prevailing viewpoint is that the descending route is the common one.—Ed.)

## FEMALE UROLOGY

### THE FEMALE URETHRA AND ITS RELATION TO UPPER URINARY TRACT INFECTIONS

H. G. HANLEY

Proc. Roy. Soc. Med., 39: 741-750, 1946

The author's chief purpose in writing this paper is to attempt to demonstrate the close relationship between urethral inflammation and upper urinary tract infection in women of the child-bearing age. The type of inflammation concerned is the non-purulent urethritis, or granular-urethritis, or cystalgia. The pathology is a urethro-trigonitis, the onset of which is generally acute, and there may be acute exacerbations. The acute onset, or an acute exacerbation, may progress to typical pyelitis.

The clinical data for this paper was obtained from the study of 433 women who complained of symptoms typical of urethro-trigonitis or who were admitted with pyelitis. A total of 310 women showed evidence of urethritis, 132 having also an associated pyelitis. Of the 187 urethro-trigonitis cases, 72 per cent were evenly distributed between the 21-30 and 31-40 age groups. However, the first onset of urethral symptoms dated back to the 21-30 age group in 48 per cent, so that the chronic cases tend to be seen in the 31-40 age group. Sixty-three per cent of the pyelitis cases occurred in the 21-30 age group.

The author found that neither abortion nor normal childbirth appeared to be an important etiological factor. There was a surprisingly low incidence of accompanying pelvic pathology.

A rapid routine cystoscopy may reveal no abnormality in these patients, and it is not until the instrument is withdrawn to show the margin of the internal urethral orifice that signs of pathology are apparent. A collar of large congested vessels may be seen, but the surest sign is the presence of edematous, translucent, pedunculated or sessile polypi, appearing singly or in clusters. For viewing these structures the urethroscope is the ideal instrument. Some workers believe that these polypi are glands analogous to the male structure, while others deny that there are glands in the female urethra.

The significance of these polypi was studied by investigating 70 women who had never had any urinary symptoms. (It was necessary to question over 200 women in order to collect these 70 symptom-free women.) Urethral polypi were present in 5 of the 70 controls. All of these 5 were cases of abortion or salpingitis. Of 19 further cases, symptomless at the time, but having a previous urinary history, 13, or 68 per cent, showed evidence of urethral pathology. These figures suggest that the presence of urethral polypi and hillocks probably indicates an inflammatory condition.

The first onset of urethral symptoms developed within 3 months of marriage



hysterectomy. Difficulty in voiding disappears in the majority of cases within several days. The development of ovarian cysts after vaginal hysterectomy is an uncommon complication. The essayists feel that the fixation-ligature technique is safe and readily taught and learned.

(See comment on following abstract of paper by Campbell.—Ed.)

## A REPORT ON 2798 VAGINAL HYSTERECTOMIES

ZEPH. B. CAMPBELL

Am. J. Obst. & Gynec., 52: 598-609, 1946

This report is concerned with 2798 vaginal hysterectomies for benign disease of the uterus performed at the Presbyterian Hospital, Chicago, by the attending and resident staff. For comparison this study has been divided into two groups, 1361 (Group I) vaginal hysterectomies done by Dr. N. Sproat Heaney from 1922 through May, 1945; and 1437 (Group II) done by the other members of the attending and resident staff from 1931 through 1944. In 1935 Heaney reported the first 627 cases in his total; these are included in this study with the additional 734 vaginal hysterectomies which he has done since that time.

Statistical study of the literature revealed an average mortality for abdominal hysterectomy, both total and subtotal in 40,587 cases, of 1019 deaths or 2.5 per cent. The mortality rate in 898 abdominal hysterectomies during the same interval and done by the same group of surgeons was 1.22 per cent. The mortality for these 2798 vaginal hysterectomies was 6 deaths or 0.214 per cent. These 6 deaths were equally divided between the two groups.

According to this author vaginal hysterectomy should be chosen whenever feasible because: (a) it permits a more regular correction of all defects than do other procedures; (b) the vaginal route causes less discomfort to the patient; (c) no abdominal scar is produced; (d) pulmonary complications and emboli are less frequent; (e) thrombophlebitis and pelvic abscess are less common; (f) trauma to the bowel, postoperative adhesions, ileus and bowel obstruction are infrequent; (g) gas pains are less severe; (h) it is less radical and safer than irradiation; (i) it affords a safe approach to many forms of adnexal pathology; (j) peritonealization can be accomplished as accurately as by the abdominal route; (k) stump carcinoma and persistent cervical discharge are prevented.

The contraindications to vaginal hysterectomy are few in number, for example, large tumors such as fibromyomas and ovarian cysts. Previous abdominal surgery is not always a definite contraindication for the vaginal hysterectomy. Many people advocate vaginal hysterectomy rather than abdominal hysterectomy in poor operative risks. It then seems logical that vaginal hysterectomy is an even safer procedure in patients who are in better operative condition.

The technical skill of the operator is of no greater importance than is the

## OPERATIVE GYNECOLOGY

### A STUDY OF 500 VAGINAL HYSTERECTOMIES

HENRY C. FALK AND IRVING A. BUNKIN

Am. J. Obst. & Gynec., 52: 623-630, 1946

Reports emanating from various gynecologic clinics have proved that vaginal hysterectomy is an operation with a very low morbidity and mortalities varying from 0.0 per cent to 3.2 per cent. The other striking features are the rarity of shock or hemorrhage, the absence of trauma to the pelvic viscera, the minimum danger of infection, the applicability of the operation to the obese and the aged, the relatively smooth postoperative course and the absence of hernia. The incidence of thrombophlebitis and pulmonary embolus is very low and pulmonary complications are also much less common.

With these facts in mind the authors of this report analyzed 500 consecutive vaginal hysterectomies with and without anterior and posterior vaginal wall repairs, performed on the gynecologic service at Beth Israel Hospital over a 5 year period from January, 1940 through 1944. A group of 14 operators took part in this work, all following a standardized fixation-ligature technique. The decision to perform the vaginal operation was for the following reasons: 1. Fibroids; 2. Bleeding; 3. Prolapse; 4. Cystocele and/or rectocele; 5. Hypertrophy and laceration of the cervix; 6. Carcinoma; 7. Sarcoma; 8. Sterilization.

The authors reached the following conclusions; vaginal hysterectomy is an operation associated with a minimum of shock and hemorrhage, low morbidity and low mortality. Only 1 death occurred making a mortality rate of 0.2 per cent. Where hysterectomy is indicated, the vaginal approach is the procedure of choice in the obese and aged. Nulliparity is no contraindication to vaginal hysterectomy. Vaginal hysterectomy is contraindicated in the following instances: pelvic inflammatory disease, endometriosis with fixation of tissues, intraligamentous tumors, the presence of a large ovarian cyst, malignancy with fixation, postradiation fixation, ventral fixation of the uterus, or previous amputation of the cervix with shortening of the cardinal ligaments.

Where there are pathologic changes in the uterus and there is associated cystocele and/or rectocele, vaginal extirpation of the uterus along with plastic repair of the vagina is wisest. These authors feel that cervicitis, sulfonamides, oophorectomy and age have relatively little effect on morbidity. Morcellation, amputation of the cervix, bisection of the fundus and coring out of the fundus of the uterus have been procedures for reducing the size of the uterus. Uteri up to the size of a 3 month gestation have been removed with relative facility and some uteri the size of a 4-5 month gestation have been removed.

Cystitis is the commonest cause of morbidity postoperatively in vaginal

## GENERAL CONSIDERATION OF HYSTERECTOMY

V. S. COUNSELLER

J. Michigan M. Soc., 45: 1357-1359, 1946

The writer discusses the indications for total abdominal and supracervical hysterectomy. The cervix is important in the selection of either operation both in respect to cervical disease and cervical mobility. For many years total abdominal hysterectomy was indicated for removal of the diseased cervix and prevention of annoying postoperative vaginal discharge. Also, it was advised to prevent carcinoma of the cervical stump. The incidence of carcinoma of the cervical stump is now generally considered to be about 0.2 per cent, and in view of such low incidence it is not reasonable to advocate total hysterectomy to prevent carcinoma, particularly when other factors may produce a higher operative mortality rate than that of supracervical hysterectomy.

If the cervix is well supported and biopsy shows that the lesion is benign, and supracervical hysterectomy is to be performed, either the endocervix should be destroyed by cautery or conization should be performed prior to the hysterectomy.

The mobility of the cervix is a very important consideration in hysterectomy. Vaginal shortening and fixation of the vaginal vault must be avoided regardless of the marital or sexual status of the patient. If the lesion requiring hysterectomy is malignant, these results need not be considered as factors. It has been the author's observation that a poorly or inadequately supported cervix produces more distress to the patient than a well-supported vaginal vault.

In respect to technique of total abdominal hysterectomy, the author points out that the placing of a clamp across the vagina to prevent contamination from the vagina is almost sure to produce shortening of the vagina, and that if the vagina is cleansed well prior to operation little infection will come from opening it. Usually, when the cervix is moderately mobile and the anterior and posterior fornices redundant, the vagina may actually be lengthened by utilizing all of the vaginal wall rather than leaving some of it attached to the cervix as is done in the clamp method.

Among the indications for total abdominal hysterectomy are some carcinomas of the cervix. Malignant lesions of the cervix are not regarded generally as an indication for the total operation; however, there are some types of cases which are better treated surgically than with radium. Complete hysterectomy is indicated definitely in cases of carcinoma-in-situ and in some cases of stage 1 carcinoma. Another very important indication for the total operation is malignant lesions of the fundus and adnexa.

In cases of benign intrapelvic lesions, *per se*, it is often necessary to perform complete hysterectomy; the condition of the cervix and its mobility are usually the determining factors. Pyometra and chronic endocervicitis associated with chronic endometritis are best treated by total hysterectomy.

choice of method of approach or preoperative preparation of the patient. Important factors in preparation of the patient are (a) eradication of foci of infection; (b) correction of anemia, vitamin, protein and fluid balance; (c) restoration of the normal vaginal flora. Meticulous hemostasis was stressed. The author of this article feels that adequate training in vaginal hysterectomy will equip a surgeon with the confidence and ability to treat many other gynecologic conditions by vaginal surgery to the great benefit of the patient.

(There is no doubt that vaginal hysterectomy has been a sort of step-child operation in many clinics. It is probable that in others it has been a little too heavily accented. There are many gynecologists who rarely select the vaginal route for hysterectomy except in some cases of prolapse and cystocele, more especially those in which there is some clear reason for removal of the uterus. In such cases the hysterectomy itself is simple enough, the more laborious part of the operation being the necessary correction of the cystocele and rectocele so often associated. As a matter of fact the vaginal hysterectomies done in cases where there is no vaginal relaxation or cystocele, while they may appear more forbidding to the beginner, can usually be done far more expeditiously.

On the other hand, I have often seen vaginal hysterectomy done in cases in which it appeared to be a surgical stunt rather than the best procedure for the particular case. I remember watching a vaginal hysterectomy in Budapest one day, the indication being a large myoma reaching to the umbilicus. It was of course removed by morcellation, the tumor fragments filling a large basin. Throughout the rather bloody procedure I kept thinking how much easier it would have been to remove that particular tumor by the abdominal route.

Not many gynecologists in this country have done vaginal hysterectomy for cervical carcinoma, though this was for a good many years before the war a popular plan in the German clinics. Aside from this, there can be little quarrel with the authors of both these papers concerning the indications and the advantages of vaginal hysterectomy, as well as the contraindications enumerated by Falk and Bunkin.

A deterrent to the vaginal operation in some clinics has been the fear of subsequent pelvic enterocoele. This hazard can be greatly minimized, but not altogether eliminated, by obliterating the cul-de-sac by means of a purse string suture including the uterosacral ligaments.

I agree that one of the most common and most annoying causes of morbidity after vaginal hysterectomy, as after any vaginal procedure, is cystitis. Probably most of us employ a retention catheter for a number of days, but spontaneous voiding is delayed in some patients until they are allowed to get out of bed, and cystitis is relatively common, even though prophylactic sulfa therapy is used. The postoperative care of the bladder in cases of this type is so important that the surgeon himself should keep a watchful eye upon it. Once a marked retention occurs, the patient is apt to be in for trouble, and then needs double care to overcome the bladder atony. Catheterization after voiding is often of great value if one wishes to avoid re-insertion of the retention catheter. It is the patient with residual urine who develops postoperative cystitis.

The low mortality reported by Campbell in the large Presbyterian Hospital series is not surprising, as it is in this institution that Heaney developed this operation to a fine art, and his associates and successors have obviously been thoroughly trained in the technique so long employed by Heaney. In this clinic it is natural and proper that the vaginal route should be the one of choice, as in others the abdominal technique has been rather traditionally the favored one. But in every clinic there are cases in which either one or the other route offers clear advantages, and no gynecologist can consider himself thoroughly equipped unless he is equally at ease whether doing hysterectomy by the abdominal or the vaginal route.—Ed.)

tributary to the growth of fibroids. The essayist has 3 very convincing case histories which are pertinent to the serious psychic trauma of hysterectomy in neurotic women: he feels that we may group neurotic women about to undergo hysterectomy into 3 categories: the indifferent, the overanxious, and the masochistic.

The indifferent woman may accept the prospect of hysterectomy with no apparent fear or apprehension. It is this type who almost idolizes the physician who performed the operation, who bears willingly and submissively all restrictions, who pays without the slightest hesitation any fee requested. On the other hand she minimizes the seriousness of her symptoms thus seeking help as late as possible. These patients can conceal their neuroses behind a submissive facade and ladylike attitude, as in the case the author presented, who only revealed her neurosis when she was faced with complete destruction. She was afraid to hurt her doctor's reputation and confide in him the deterioration of her neurosis subsequent to his indispensable surgery.

The second type, the overanxious woman, will turn to numerous other authorities for re-examination and reconsideration of the necessity of the proposed surgery. She simply cannot give herself into any physician's hands, she impulsively bargains about the site of the incision, the portion to be removed, especially and persistently about the fee; she wishes to be informed about the time needed for operation and convalescence, kind of anesthesia and many other details of lesser importance. Their wish to save fertility stems from the craving to compete with men, as shown in their professional career and conduct of marriage. This woman is the revengeful type and the next victim is the operator whom she charges with neglect, incompetence or selfishness. This patient accuses the operator of having ruined her health; she will make him responsible for having caused her menopausal symptoms, even many years after the operation.

The third type is the masochistic woman, best illustrated by a case of Grünert, a 39 year old woman operated on for adhesions four times a year for a total of twenty-six operations. The author concludes that a discussion of this post-operative complication merely stressed the fact that castration for uterine fibroids is likely to elicit untoward neurotic reactions which are less due to surgery itself than to some psychodynamics, which in his opinion are acting upon myofibroids in one way or another. This investigation strives for the elimination of one factor which might abate the results of surgery.

(To say that some women do not suffer some psychic upset after hysterectomy would be foolish, but I cannot believe that this is often as big a problem as is implied in *this paper*—it would be unkind and discourteous to say that this is a typical paper by a psychiatrist. Nothing is of greater importance in the avoidance of psychic trauma after hysterectomy, as well as other gynecological operations, than the preoperative management of patients in whom such operations are indicated. The surgeon should take the time and trouble to explain to the patient why the operation is necessary, what the hysterectomy will entail in the cessation of menstruation and childbearing, but above all what it will not entail. As regards the latter, he should explain that it does not bring about the "change of life" if ovarian tissue is conserved, as it usually is; that it does not defeminize the patient, that it has no harmful effect

(This is a tempered discussion of the subject by an experienced gynecological surgeon. He emphasizes the importance of the cervix in selecting the type of operation. It is my impression that the total procedure is the one which is most often performed at the Mayo Clinic, with which the author is associated, although it is obvious, and proper, that the subtotal method is often carried out. The incidence of stump cancer should not, in my opinion, be the only influencing factor. In spite of such preventive measures as cauterization or conization, it is not infrequent to see recurrence or persistence of leucorrhea, and at times staining or bleeding which may not be cancerous in origin, but which will make the surgeon wish he had removed the cervix instead of doing a subtotal hysterectomy. Again, the fact that the cervix seems entirely normal at the time of hysterectomy does not preclude subsequent cancer, because a surprisingly large proportion of the very early carcinomas now being picked up have been found in cervixes which show little or no gross pathology.)

On the other hand, it would be silly and rash for the surgeon to insist on the total technique when this would greatly increase the dangers and difficulties of the operation, as in the presence of great obesity, or a very deep pelvis, or a fixed, inaccessible cervix, or an extensive endometriosis, or pelvic inflammatory disease with fixation of the uterus to the rectum. The sensible plan in most such cases is subtotal hysterectomy, with proper attention to any cervical pathology which may be present. When, however, the total operation can be performed just about as easily and safely as the subtotal, as is true in the majority of cases, its advantages would seem to be clear. In spite of the statements of some, I believe that the total operation is, generally speaking, a somewhat bigger one than the subtotal, with definitely more hazard to one who has not trained himself thoroughly in the technique, so that the individual factor of the surgeon, as well as of the patient, must be considered in making the choice.—Ed.)

## PSYCHONEUROTIC SYMPTOMS FOLLOWING HYSTERECTOMY

FRITZ WENGRAF

Am. J. Obst. & Gynec., 52: 645-650, 1946

During the past few years the author of this report has been impressed by three outstanding factors postoperatively in hysterectomy on neurotics. First that these patients develop "new" symptoms which they do not tell their gynecologist. Second, the patient has an attitude toward the gynecologist who performed the operation which is different from her attitude toward the psychiatrist, to whom she spontaneously presents an abundance of facts which she would never think of telling to the gynecologist. In her reticence toward the operator the patient may impulsively, in accordance with the main patterns of her neurosis, condemn him or protect his reputation. Third, it was the author's opinion that the indication for hysterectomy has an important bearing upon the patient's postoperative reaction. In 3 years, 32 patients who had undergone hysterectomy for fibroids yielded 6 patients who believed that their neuroses became more severe after operation. Two felt that hysterectomy had favorably affected their neuroses. Several observations have led the author to believe that neurotic mechanisms of which frigidity is the most common, are con-

## STERILITY

### THE RECEPTIVITY OF CERVICAL MUCUS TO SPERMATOZOA

MARY BARTON AND B. P. WIESNER

Brit. M. J. , 2:606-610, 1946

Experience has shown that cervical faults are not always apparent in the post-coital (Sims) test. The writers have seen many cases where spermatozoa of undoubted fecundity did not penetrate or did not survive in cervical mucus which, by all accepted signs, presented the fecund appearance associated with the ovulatory phase. Therefore, they have attempted to devise a method for testing directly the receptivity of the mucus and the invasive power of the spermatozoa.

Semen and cervical mucus are both virtually immiscible and, in accordance with the general behavior of immiscible colloids and liquids, an interface is formed where the semen and cervical mucus are in contact with each other. This interface may be likened to an invisible membrane, the passage of small particles across which may require an appreciable amount of energy. When fecund semen is brought into contact with healthy cervical mucus in suitable *in vitro* preparations, it may be seen that most spermatozoa, on approaching the interface, are retarded from entering. However, many normal spermatozoa pass through the interface and survive in the cervical mucus for hours or days.

This process can be studied individually in special contact preparations, the receptivity of the mucus being assessed by exposure to fecund semen, while the semen is assayed against normal ovulatory mucus. A capillary chamber, charged with a film of cervical mucus 2-5 mm. wide and about 50 deep, is prepared. This chamber is then charged with semen of established fecundity and sealed. The sealed slide is examined with a binocular microscope at intervals of not more than 2 hours.

In normal cases the sealed preparation presents a characteristic appearance. On microscopic examination a clear boundary may be seen between the water-clear cervical mucus and the opaque semen. At this interface the spermatozoa tend to congregate in dense masses; a small proportion of highly active sperms pass into the cervical mucus. Many sperms pass back into the semen, others which have passed through the interface continue to be motile, but fail to show any forward progress, and still others soon lose all motility. Thus, the total density of sperms decreases, but the proportion of motile ones increases, with distance from the interface. After varying periods a point of culmination is reached; the seminal fluid contains comparatively few motile spermatozoa, since it has been impoverished by continuous emigration of the most active ones. At the interface the semen is bounded by a dense felt of spermatozoa, too weak to penetrate the interface, and assembling to form an obstacle to the more active

upon sex relations, which may actually be improved by the removal of some lesion which may have caused dyspareunia or invalidism. The woman is entitled to know these things, and if she is thus prepared one need have little fear of psychic trauma after operation.

On the other hand, if a hysterectomy is done more or less mechanically, with no adequate explanation either before or after operation, it is easy to see that she may be resentful, especially if she is doubtful about the absolute necessity of the operation. After all, aren't a good many hysterectomies done unnecessarily? A reading of Miller's recent article (*Hysterectomy: Therapeutic necessity or surgical racket?*, *Am. J. Obst. & Gynec.*, 51: 804, 1946, abstracted on p. 760, with editorial comment, in *Survey*, Oct., 1946) will be enlightening on this point.

Finally, the preoperative evaluation of a patient's psychic make-up will help the surgeon to avoid unpleasant postoperative repercussions. Even highly neurotic, ignorant and poorly balanced patients may develop lesions which fully justify hysterectomy, but in which alternative and more conservative procedures can often be chosen, such as supra-cervical hysterectomy with preservation of the menstrual function, to mention but one example. We can talk all we want about the unessentialness of menstruation to a woman's physical well-being, but the fact remains that there are still some women who feel that they have been to some extent defeminized if this function is abolished. All these considerations are of course of subordinate importance in the case of such life-endangering conditions as cancer, but many more hysterectomies are performed for benign than for malignant disease. Psychosomatics, common sense, the treatment of the whole patient rather than the lesion—all these things are as important in gynecology as in other fields. As a matter of fact, they are probably more important in gynecological practice than in any other field of medicine. —Ed.)



therapy seems to justify its employment before recourse is had to intensive treatment or other specific measures. 3 figures.

(So far as I can find, the Sims test to which the authors allude is the one which in this country is known as the Huhner test. It is widely employed as a method of determining the effect of the cervical and vaginal secretions upon the motility of the spermatozoa. It no doubt has some shortcomings, as the authors have apparently found.

They do not seem to be aware of the fact that the *in vitro* test of spermatozoa brought into contact with cervical mucus which they describe is practically identical with that described as far back as 1928 by Kurzrok and Miller (Am. J. Obst. & Gynec., 15: 56, 1928). The technique is also described fully in Kurzrok's book on *Endocrines in Obstetrics and Gynecology*, 1937, p. 426 (Williams & Wilkins Co.). It has not, however, supplanted the simpler Huhner test and, in fact, is now rarely alluded to in discussions of sterility.—Ed.)

## AN ANALYSIS OF 257 CASES OF STERILITY

S. G. WINSOM

Am. J. Obst. & Gynec., 52: 631-635, 1946

This presentation is based upon a study of 257 barren marriages, treated in the outpatient department of Mount Sinai Hospital and in the private office of Dr. Charles Mazer during the 5-year period 1940 to 1944 inclusive. General studies of the patient included a complete physical examination and laboratory studies, consisting of a complete blood count, urinalysis, blood Wassermann and chemistry, and cervical smears. Special studies included the following: (1) a Hühner test to determine whether semen is deposited, whether there is an adequate invasion of the cervical canal and whether there is any hostility of the cervical secretions; (2) a Rubin test and/or hysterosalpingography to determine the degree of patency of the Fallopian tubes, site of obstruction and the presence of intrauterine pathology; (3) Endocrine studies, relating to abnormalities of the menstrual cycle and anovular menstruation. These studies included endometrial biopsy, vaginal smears, estrogen determinations and the basal body temperature.

Of the 257 cases of barren marriages, 53 or 20.6 per cent were of secondary sterility and 204, or 79.4 per cent of primary sterility. The duration of sterility ranged from 1 to 20 years, with an average of 5 years. The age incidence was from 20 to 39 years with an average of 28.2 years. Seventeen or 6.6 per cent of the patients had gross pelvic pathology such as large fibromyomas, ovarian cysts, and chronic salpingitis. Myomectomies were performed on 4 patients, 3 of whom conceived and carried to term. Three ovarian cysts were resected leaving portions of the ovary involved. One of these became pregnant.

Tubal damage was the most frequent cause of sterility. Of the 257 patients, 90 had partial and 50 had total occlusion of the Fallopian tubes or a total of 54 per cent. In 61 cases or 23.7 per cent tubal occlusion was the sole cause of the sterility. Of 53 patients receiving repeated transuterine insufflations as

ones on either side of the boundary. On the cervical side there is a belt of oscillatory or immotile sperms, the more distant mucus being uniformly invaded by motile sperms. This condition characterizes the "positive" invasion test.

In cases of undoubted female infecundity, 6 fairly definite types of mucus may be distinguished. These may be summarized as follows:

1. Spermatozoa pass through interface and penetrate whole depth of mucus film, but lose motility within 10 to 60 minutes.
2. Spermatozoa pass through interface and invade mucus to shallow depth (less than 0.2 mm.) where they lose motility.
3. Spermatozoa pass through interface but lose motility and even cease to oscillate in the boundary region.
4. Spermatozoa fail to penetrate mucus, congregating at interface to form typical felt.
5. In rare cases spermatozoa die soon after their arrival at the interface.
6. In some cases the cervix is comparatively "dry" and does not yield suitable mucus for the test.

Three factors appear to determine the suitability of cervical mucus for fecundation: (1) capacity to allow true (forward) motility of spermatozoa; (2) capacity to sustain sperm life; and (3) invadability of mucus.

The invasion test was carried out in numerous instances prior to artificial insemination, the latter being followed by the Sims test. The results showed that a positive invasion test almost invariably corresponds to a satisfactory Sims test, and conversely, that the Sims test reveals inadequate cervical invasion in cases where the invasion test shows defective mucus.

The receptivity of the cervical mucus depends apparently on intimate structure and possibly on chemical factors which are not wholly reflected by gross characteristics or measured by present physical methods. While the frequency of cervical dysfunction cannot be estimated precisely at this stage, it appears to be common even in the absence of endocervicitis.

In the event of a negative invasion test, investigation of possible causes must be instituted. It must be remembered that impaired cervical function reflects only, in many cases, general debility with or without specific disturbances. Also, adequate cervical secretion depends on estrogenic secretion. Last, the cervix itself may be the seat of an infective process. These various factors relating to cervical function, and thereby to fecundity, are interlinked, and the proper investigation of cervical impairment involves a wide field of clinical procedure.

The administration of estrone has been found useful in nearly all cases of defective invasion, whether other measures were required or not. In cases of cervicitis of non-gonococcal origin, sulfanomaides were administered, with startling results. In numerous cases where a purulent cervical mucus plug had persisted for years or had recurred after treatment of other types, the cervical mucus assumed normal appearance, permitted sperm invasion and survival, and pregnancy resulted. The authors state that the success of mild sulfonamide

The results reported in patients with partially occluded tubes as a result of repeated insufflation are good, confirming the general belief that, while insufflation is primarily a diagnostic procedure, there can be no doubt of its not infrequent therapeutic value as well. Although the group in which myomectomy was done is small, the results reported are good. While numerous myomas of course do not preclude pregnancy, I believe that there is no doubt that they through some unknown mechanism impose a considerable degree of at least relative infertility. If a relatively young woman has one or more myomas of any size, and if other factors of infertility have been eliminated, I for one do not hesitate to advise myomectomy, even though there are no other symptoms referable to the neoplasm. I have seen too many instances of pregnancy, often rather prompt after a long period of sterility, following myomectomy to permit any doubt of the frequent wisdom of this procedure. Nor is this treatment very radical, since most such patients of the younger group would need later operation anyhow, and if too long delayed this later operation is likely to be a hysterectomy rather than a myomectomy.

The results reported in the cases where the masculine factor was apparently chiefly or partly at fault are probably better than most gynecologists could report. Nor are they easy to evaluate when the inadequacy is of more moderate degree, because there is still considerable uncertainty as to the criteria of semen inadequacy.—Ed.)

## CONTRACEPTION MASKING STERILITY AND INFERTILITY

### TUBAL AND SEMINAL FACTORS IN 1,000 Cases

I. C. RUBIN

J. A. M. A., 132: 1047-53, 1946

Various women after using contraceptives for varying lengths of time have been chagrined to find after one childbirth or after spontaneous or induced abortions that they are unable to become pregnant again. Others have used contraceptives, thinking they could become pregnant at will and find they or their husbands have been sterile. Among 590 women who became gravid after treatment for sterility, 190 were found to have used contraceptive precautions earlier. Among 1,000 cases of sterility observed by the author, only 33 in the primary sterility group had no history of use of contraceptive; and only 59 in the secondary sterility group.

In this group of 1,000, there were 711 cases of primary sterility, that is, women who had never conceived, and 289 cases of secondary sterility, or women who had been pregnant one or more times. The 466 couples who had practiced contraceptive measures during the first part of life, were given tests for sterility. In 133 women abnormalities of the pelvic organs or diseased conditions which could lessen fertility were noted; the most frequent abnormalities were uterine hypoplasia, uterine fibromyomas, cervical stenosis and uterine retroversion. Endocrine dysfunction was found in 34 women (7.3 per cent); 19 had menstrual difficulties and 15 had hypothyroidism.

Determination of seminal inadequacy has proved difficult. Absence of sper-

one therapeutic measure, 43 or 81 per cent conceived. Of 35 patients treated with iodized oil instillations—lipiodol—12 or 34.2 per cent conceived. Of 140 patients treated for tubal occlusion, 66 or 47 per cent conceived. Twenty-two of 50 patients or 44 per cent with total occlusion conceived and 44 of 90 patients or 48 per cent with partial occlusion conceived.

Failure of deposition of spermatozoa by fertile mates or inadequate invasion of the cervical canal, the cervical factor in sterility, was one of two or more factors in the barrenness of 97 or 38 per cent of the cases. In 73 of these cases or 75 per cent conceived, following treatment of the several factors involved. The treatment consisted of removal of obstructive agents such as pinhead os, cervical polyps, and viscid cervical secretions. Twenty-six patients or 39 per cent conceived following this form of treatment. Precoital alkaline vaginal douches or Nutrisal were employed in instances of oligozoospermia and partial necrozoospermia in the hope of maintaining the vitality of the spermatozoa deposited in the posterior vaginal fornix. Homologous insemination of the cervix was employed when all other measures failed. It was successful in the single case employed.

Of the 134 patients that showed endocrine menstrual disturbances, alone or in combination with other causes, 54 or 42 per cent conceived following therapy. The menstrual disturbances consisted of amenorrhea, menometrorrhagia, and anovular menstruation. Of 49 patients treated for amenorrhea 29 or 59.1 per cent conceived. Low dosage irradiation to the pituitary and ovary was the most effective form of therapy. Of 32 cases so treated, 28 or 87.5 per cent conceived. Of 3 patients treated for menometrorrhagia, one conceived following dilatation and curettage followed by chorionic gonadotropin.

Of 82 cases treated for anovular menstruation 41 or 50 per cent conceived. Thirty-four patients received equine gonadotropin; 15, or 44 per cent of these conceived; 1 of these aborted. Of 19 patients treated with Synapoidin, 12 or 63 per cent conceived and 1 of these aborted. Of 29 patients receiving pregnant mare serum plus chorionic gonadotropin, 14 or 48.2 per cent conceived.

In 106 cases or 41 per cent the husband was partly or wholly at fault for the sterility of these; 68 or 64.1 per cent conceived following therapy of the husband simultaneously with treatment of his mate for conditions unrelated to the low degree of fertility of the husband. Absolute sterility in the male was rare; it was only found in 10 cases or 9.4 per cent. Eighty-six cases or 81.1 per cent had oligozoospermia and varying degrees of necrozoospermia.

In the entire series of 257 cases studied, 129 or 50 per cent conceived following therapy. There were seven abortions and one ectopic pregnancy. There were no stillbirths or neonatal deaths.

(There are a number of interesting points in this study of a rather large group of cases of barren marriage. First of all, it emphasizes the fact that the percentage of successes is, after all, very gratifying if the investigation of both partners is thorough and the treatment meticulous, including all of the possible factors unearthed by the diagnostic study. We cannot of course flatter ourselves that a successful outcome is always the result of the treatment employed, but in a not inconsiderable proportion I believe we can.

closure and previous pregnancies ending in abortion or miscarriage, are important. Contraceptives, such as devices inserted into the cervical canal or into the uterus should be ostracized. Rubin stated that he had been concerned only with the general masking of infertility by the use of contraceptives which lead couples into a false sense of security. He found few women who could conceive at will following the use of contraceptives.

(Every gynecologist has encountered cases in which contraception has been practiced for perhaps long periods of time, and in which subsequent sterility studies after the discontinuance of contraception, have revealed sterility factors which quite surely had existed since marriage, and in which there would have been little or no chance for conception even if contraception had not been practiced. These are truly instances of "love's labor lost". The careful statistical study of Rubin, based on his large material, graphically emphasizes this point, as well as others which arise in the treatment of sterility patients.

It will perhaps be surprising to some that of 711 cases of primary sterility, only 33 gave no history of contraception. While I can give no figures, I am sure that in my own practice a considerably higher proportion have been anxious for children from the start, with no history of contraception. Of interest is the fact that in Rubin's 466 couples who had previously practiced contraception, no less than 133 revealed conditions imposing at least relative sterility. Only 34, incidentally, had endocrine dysfunction, which again impresses me as a lower incidence than most of us would expect. Only 15 had hypothyroidism, the finding of which is always rather encouraging, since it is apt to inspire the hope that thyroid medication may be helpful.

Obviously Rubin feels that we still have much to learn about the factor of masculine inadequacy, in spite of the numerous studies and real advances made in semen cytology during recent years. Even a normally motile spermatozoon of normal morphology may still lack the essential germ plasmic quality essential for fertilization purposes, or so one is led to believe by some of the otherwise almost unexplainable cases at times encountered.

The tubal factor, found to be 51.6 per cent in the primary cases with contraceptive cases, is impressive, since it is probable that many of these patients might have been given a better chance for pregnancy had the sterility not been masked by contraception, and treatment thus delayed. Whether the tubal factor has existed before or only since marriage, its early recognition, as Rubin states, is important, since it may make contraception unnecessary and allow the couple to plan for later adoption, which often entails considerable delay.

Taken all in all, this is a valuable and provocative study, and the paper should be read by all those interested in the management of sterility.—Ed.)

## DIAGNOSTIC VALUE OF HYSTEROSALPINGOGRAPHY

ALFREDO L. DE NAVA

Ginec. y Obst. de Mexico 3: 179-185, 1946

The importance of hysterosalpingography as an exploratory method is emphasized whenever it is used as a complementary aid to other semiologic procedures, in order to help clarify certain diagnostic doubts in the following conditions: (1) tubal obstruction, (2) abnormal positions of the uterus, (3) congenital malformations, (4) uterine tumors, (5) extra-uterine tumors, (6)

matozoa by the Hühner test is not considered conclusive evidence of male sterility but azoospermia and extreme degrees of oligospermia are acknowledged causes of sterility. Also absence of motility of spermatozoa in vaginal or cervical secretions one or two hours after coitus is not a positive index of infertility. On the other hand, the satisfactory nature of the semen is determined by observation of a sufficient number of motile spermatozoa in the vagina and cervix. In jar specimens examined, 92 of 199 (46.2 per cent) samples were inadequate because of azoospermia or definite oligospermia.

Tubal impairment was found in 182 of 353 (51.6 per cent) cases of women with primary sterility who practiced contraception; 75 (21.3 per cent) had nonpatent tubes; 37 (10.5 per cent) had spastic tubes. Thus over 50 per cent had tubal impairment. It is not known to what extent this condition was acquired after marriage.

Of 466 couples with primary sterility, 374 couples had demonstrable abnormalities; tubal inadequacy or seminal inadequacy or both was found in 279 couples (74.6 per cent). In the group of 212 couples who did not use contraceptives, these factors were also found in 172 couples (81.1 per cent).

Fertility may occur after treatment of tubal inadequacies or of oligospermia or even without treatment; the sooner the causal factor is recognized and treated, the better the prognosis. In those in whom the factor is absolute and will not yield to treatment, the facts should be known as soon after marriage as possible. Unnecessary contraceptive measures should be abandoned and psychologic adjustments made and adoption of a child considered or possibly impregnation by a donor, if children are desired.

In cases of secondary sterility, if the woman gave birth to a living child, chances of further fertility were good but if there was a nonviable issue, such as ectopic pregnancy or abortion, the threshold of fertility should be determined in order to institute corrective measures early.

Many couples lose precious time by using contraceptive measures and therefore persons contemplating marriage are advised to consult their physicians regarding their capability for reproduction, or do so soon after marriage, in order to discover the 15 per cent chance of sterile mating. Eighty-five per cent of all marriages have been proved in the past to be fruitful but the author thinks it is possible that sterility may have increased in the last two or three decades.

In the discussion that followed Payne pointed out that an increased incidence of male infertility has been noted. In cases observed by him, 67 per cent of the husbands in infertile marriages were found below par; 32 per cent responded to treatment and their wives became pregnant. Tompkins remarked that the men are infertile in about 40 per cent of sterile matings. Hypospadias might have been discovered before marriage; endocrine abnormality can be proved by laboratory tests. A history of trauma, of gonorrhea or of harmful occupation of the husband is important. X-ray workers, workers with high frequency currents, taxicab drivers, truck drivers, men sitting for long hours in one position and pilots of planes are in occupations considered dangerous in this respect. In the wives, history of gonorrhea, appendicitis, tuberculosis leading to tubal

Before one decides to accomplish this procedure, a thorough investigation as to the woman's capacity for fecundation ought to be done. For this purpose, besides physical and pelvic examinations, the following procedures should be performed: hysterosalpingography, common endometrial biopsy, study of the endometrium (biopsy) in so far as its glycogen metabolism is concerned, determination of the exact day of ovulation by means of the use of basal temperature curves, daily dosifications of the urinary pregnandiol during the period in which ovulation is more apt to occur, intermenstrual endometrial biopsies, study of the vaginal cytology, etc.

It is needless to say that all causes of sterility originating in the cervix, vagina and vulva ought to be treated prior to the insemination.

Low spermatic figures in number and vitality are not considered as an indication for this test, since those conditions are apt to respond to medical treatment.

(See comment on following abstract.—Ed.)

## COMMENT ON DR. CARLOS GUERRERO'S WORK ON ARTIFICIAL INSEMINATION

M. MATEOS FOURNIER

Ginecologia y Obstetricia de Mexico, 3: 153-162, 1946

In this paper, the author strongly criticises Dr. Guerrero's ideas concerning the indications for the employment of artificial insemination, which were expressed in the former article. Contrary to the latter, the author considers this subject in a much broader manner, and, indeed, declares that there are definite indications for both homologous and heterologous types of artificial insemination. For the former one, the well known procedures for investigating tubal patency, probable date of ovulation, etc., ought to be done first. Insemination should be repeated on succeeding days, 2 or 3 times, within the period in which ovulation probably takes place, and it ought to be insisted upon for several months in the event of failure.

In order to accomplish the heterologous type of artificial insemination, aside from the preliminary procedures described above, other demands must be taken into consideration by the specialist, such as: absolute discretion and professional honesty, selection of an adequate donor whose family and past histories must be well investigated. The latter should have serologic reactions for syphilis done and his semen thoroughly examined in order to enable one to choose a specimen of high biological quality. The donors should be selected amongst men between 20 and 30 years of age, and whenever possible, they should resemble the husband physically.

(The viewpoint expressed by Fournier is probably about what would be held by most of the enthusiasts for artificial insemination in this country, while the far more restricted

hydrosalpinx. In the latter condition, a typical picture is obtained, which makes possible a correct diagnosis in 90% of the cases. It is produced by the liquid injected into the genital tract in contact with that contained in the hydrosalpinx. Since both of them possess different density, they do not mix homogeneously, and, therefore, the oil can be seen as drops irregularly distributed within the tubes. In order to be of a diagnostic value, this picture ought to persist in the plate of control.

Hysterosalpingography can be considered almost harmless, providing that it is used at the proper time of the menstrual cycle (between the 4th and 10th days following menstruation), and in the absence of genital infection and uterine bleeding, in order to prevent possible embolism due to the oil solutions. It should also be avoided in cases suspicious of intra- or extra-uterine pregnancy, despite the fact that it has been advocated by some specialists as a diagnostic aid in such circumstances. The same attitude applies whenever there is a cardiac or pulmonary condition present, or in case the patient is too old.

According to the author's ideas, great advantages would accrue from the creation of a new specialized field: Radiology-Gynecology.

(In our own country there are undoubtedly some gynecologists who are just as enthusiastic in the employment of hysterosalpingography as the author of this paper. There are others who resort to it much more sparingly. This division is noted especially in the study of tubal obstruction, and the pros and cons of this difference of opinion have been discussed in editorial comments on abstracts in previous numbers of the Survey. The best recent summary of the subject is that of Norman Miller (J. A. M. A., 129: 243, 1946, abstracted, with editorial comment, in April Survey, 1946, p. 280).

It is difficult to believe that a diagnosis of 90 per cent of the cases of hydrosalpinx can be made by this method, for the simple reason that in most cases of this tubal lesion, the isthmus portion of the tube is completely blocked, so that the injection fluid cannot find entrance. It is true that the older textbooks described a "profluent" form of hydrosalpinx, characterized clinically by periodic cramp-like pains (*colica scortorum*) which were accompanied by vaginal gushes of clear fluid, supposedly from the tubes. But how often do gynecologists observe such cases? They must be very, very rare.—Ed.)

## ARTIFICIAL INSEMINATION

CARLOS D. GUERRERO

Ginecologia y Obstetricia de Mexico, 3: 147-152, 1946

The indications for artificial insemination, according to the author's ideas, are limited only to those cases in which there is a complete and definitive incapacity of the husband to inseminate his wife, even in the vulva. This is observed in the case of impotence.

The only type of artificial insemination accepted by the writer is the one performed by using the husband's sperm. He emphatically denies the necessity of using the sperm from another person (heterologous), and, as a matter of fact, does not conceive its employment by any means whatsoever.



## MISCELLANEOUS

### PHLEBOTHROMBOSIS AND THROMBOPHLEBITIS IN GYNECOLOGY AND OBSTETRICS

C. G. COLLINS AND E. W. NELSON

Am. J. Obst. & Gynec., 52: 946-963, 1946

At Charity Hospital in New Orleans during the period from July 1, 1939 to January 1, 1946, in a series of 536 gynecologic deaths, there were 50 cases in which intravenous clotting was present in the pelvic veins, an incidence of 9.3 per cent. The conclusions reached in this paper are based on a study of these cases.

In order to prevent the complications arising from intravascular clotting in gynecology and obstetric practice, the patient should be brought to the operating or delivery room in the best possible condition. Focal infection should have been removed, dehydration and demineralization combated, anemia eliminated, circulatory collapse and chilling prevented, abdominal distention minimized, and any interference with full respiration and any mechanical retardation of the venous return flow eliminated. Patients with varicosities should have their legs tightly wrapped in elastic bandage prior to operation or delivery. Postoperatively, the patient should be made to move the extremities as much as possible, and early, selected, controlled ambulation should be encouraged.

The routine postoperative or postpartal examination of the patient's legs is as important as examination of the abdomen. No complaint of thoracic pain, pain in the leg, or swelling of the leg should be casually dismissed.

Cases of pelvic tumors with unilateral or bilateral edema of the legs should be considered as having phlebothrombosis of the deep veins of the extremity or pelvis until otherwise proved. One should be careful about ascribing the edema or swelling to pressure produced by the growing tumor. In all cases in which phlebothrombosis or thrombophlebitis is found to be the etiologic factor, adequate therapeutic measures should be instituted prior to operation on the abdominal tumor.

In those cases of suppurative pelvic thrombophlebitis which fail to respond to conservative measures, and especially those in which infarction has occurred, surgical therapy should be instituted. In the event that this is done, the return flow of the blood from the uterus should be ligated, i.e., ligation of the vena cava and both ovarian veins. Such ligation will save a number of lives, and the complications following this procedure are slight, if any. Following ligation of the vena cava, the chances of postoperative complications can be minimized if the patient has routine postoperative lumbar sympathetic blocks, or if the sympathetic lumbar chain is interrupted at the time of operation.

Although the death rate from puerperal sepsis throughout the country has

indications given by Guerrero, who is a very competent gynecologist and endocrinologist, represent a viewpoint which must be widely held in a Catholic country like Mexico. It is only natural that one's attitude toward this question should be influenced by one's religious convictions. Entirely aside from this consideration, there are others which dampen the enthusiasm of many gynecologists for artificial insemination, such as certain medico-legal connotations. Again, many look upon it as a rather messy, subterranean sort of procedure, so that they are likely to refer applicants for insemination to a small group which in every large community have developed a special interest in it.—Ed.)

phlebitis or an embolus following a previous operation, prophylactic interruption would seem advisable.

There has been no immediate mortality from the operation for ligation of the femoral veins and, except for an occasional lymphorrhea from the wound, no serious complications have occurred. There is little postoperative morbidity. To the writers' knowledge emboli have never occurred at the time of ligation or during the use of suction in the removal of clots from above. Emboli following vein interruption are usually due to faulty technique and should not occur if the operation is done correctly. If emboli do occur, they are not fatal and the use of dicoumarol has prevented further emboli.

### VAGINAL CELL EXAMINATION AS A ROUTINE IN DIAGNOSIS; A STUDY OF VAGINAL AND CERVICAL CYTOLOGY AS RELATED TO ABNORMAL GROWTHS

J. E. AYRE

Southern M. J., 39: 847-852, 1946

This report concerns a series of 2320 gynecologic cases submitted to cytological study for malignancy. Two hundred and two cases of cancer were diagnosed by smear and confirmed by biopsy. There were 24 positive smears with negative biopsy and 10 negative smears with positive biopsy, giving an average deviation in diagnosis between smear and biopsy of 2.96 per cent.

The centrifuge technic and the glycerine method for mailing cytologic specimens are briefly described by the author.

A group of pre-clinical, asymptomatic cases has been detected by routine cytologic tests and a new cell complex is described in cases showing a linkage of abnormally high cornification (estrogen) with a measurable thiamine deficiency. The cytologic picture in these cases appears quite distinctive, with the following features:

- (1) Anaplastic squamous cells.
- (2) Abnormally high cornification.
- (3) A tendency to multi-nucleation of the cornified cells.
- (4) Atypical cornified cells showing large, pyknotic dense nuclei.

These cases have been grouped as precancerous. Nineteen such precancer cases have been identified to date. 6 figures.

been materially lowered since the advent of chemotherapy and antibiotics, sepsis is still a major factor in the production of maternal mortality. It is hoped that with the advent of newer chemotherapeutic agents and antibiotics, by legislation directed against abortionists and by education of the public and physicians, some day we will be able to report not on how many patients died of puerperal sepsis or survived puerperal sepsis as a result of conservative or surgical therapy, but that this dreaded complication is no longer seen.

## THROMBOPHLEBITIS AND PHLEBOTHROMBOSIS IN GYNECOLOGIC PATIENTS; THE PROPHYLAXIS, RECOGNITION, AND TREATMENT

J. V. MEIGS AND F. M. INGERSOLL

Am. J. Obst. & Gynec., 52: 938-945, 1946

Because of the seriousness of embolism in cases of thrombophlebitis, a means has been sought to prevent fatalities from this cause in postoperative patients. From 1937 to 1945, 1057 femoral vein ligations have been done at the Massachusetts General Hospital, and it is the general opinion there that, if it could be certain that a clot was present in any given vein, a ligation above that vein should be done at once.

The material for the present report comes from the public and private wards of the Massachusetts General Hospital. In a series of 3503 gynecologic operations, 75 vein interruptions have been performed. There were 5 deaths from emboli; in 4 of these cases the veins were not interrupted.

In examining postoperative patients, the most important sign is tenderness in the calf on pressure with the fingers and thumb. This was present in 53 per cent of the 75 patients whose veins were interrupted. Next, the foot is brought into dorsal flexion and, if pain is caused, it is very significant (Homans' sign). If this sign is positive, thrombophlebitis or phlebothrombosis is probably present. Homans' sign was positive in 28 per cent of these 75 cases. If there is an obvious difference in the 2 legs, and if the swelling is in the tender leg, the diagnosis is definite.

For prophylaxis, active exercises are carried out by every patient as soon as she is conscious. Bicycle exercises are continued until the patient is out of bed. Immediately after operation the foot of the bed is elevated upon 8-inch blocks until the following day. Patients are allowed out of bed as soon as they ask to get out, and always before the tenth postoperative day.

The surgical treatment of thrombophlebitis and phlebothrombosis consists of the interruption of the vein above the clot. It is always necessary to operate on both legs. In the authors' experience, ligation of veins adds very little to the shock of operation, delays it but a short time, and in patients who have had

The biopsy curette cannot replace the ordinary curette in cases of abnormal uterine bleeding for purposes of either diagnosis or treatment.

In cases of abnormal uterine bleeding, a diagnostic curettage should be done, even in the face of an obvious and non-malignant cause of the bleeding.

All pelvic complaints should be exhaustively investigated before surgical treatment is planned. There is no substitute for complete medical history taking and thorough general and regional physical examination. The gynecologist must be conscious of extra-genital pelvic pathology even in the presence of presumed genital pathology.

The pessary test is still applicable to determine whether malposition of the uterus is actually the cause of pelvic symptoms.

Diagnostic curettage must be performed at the optimal time for recovery of the pathological endometrium. Fractional curettage should be done in order to aid in localizing the lesion.

The gynecologist should liberally consult the urologist, the proctologist, the orthopedist, the neurologist and the roentgenologist.

## LEUCORRHEA; A DIAGNOSTIC AID

D. LAZARUS AND E. E. LAZARUS

M. Rec., 159: 672-674, 1946

The writers outline various causes of leucorrhea and discuss the characteristic appearance of the discharges with their diagnostic importance.

In the case of an acute discharge associated with urinary symptoms, attention should be focused on gonorrhea, *Trichomonas vaginalis* and monilia infection. If an acute discharge be greenish and creamy, the vagina and cervix granular and red, and there is urinary discomfort present, one may be certain that he is dealing with a Neisserian infection. Should the discharge be creamy, frothy and effervescent in character, with urinary symptoms and vaginal itching, and aggravated at the menstrual periods, *Trichomonas* may be diagnosed with safety. In monilia infection the discharge is scant, there is severe vaginal and perivulvar itching, the vaginal mucosa is lobster-red in color, and on its walls may be found many white mucous patches which are easily removed by wiping, without bleeding of the underlying mucosa. The last 2 factors differentiate it from leukoplakia.

A profuse, purulent discharge, intermittent in nature, should arouse suspicion of a pyosalpinx which is emptying itself at intervals.

A malodorous discharge may be due to a foreign body in the vaginal. It may also be due to retention of secundines, abscess of the endometrium, malignancy of the uterus or cervix or to degeneration of a submucous leiomyoma or cervical polyp.

## PROTEINS IN OBSTETRICS AND GYNECOLOGY

M. L. McCall

M. Rec., 159: 610-613, 1946

Adequate protein nutrition in pregnancy is important. W. Tompkins has shown the dearth of obstetrical complications, especially of the toxemias of pregnancy, when a high protein diet is given prenatally. In severe cases of hyperemesis gravidarum and in acute yellow atrophy of the liver a high protein intake is necessary to protect the liver.

In gynecology hypoproteinemia may be clinically manifested by surgical shock, suppression of urine, hemoconcentration, abdominal distension, liver damage, edema, ascites, faulty wound healing and poor resistance to infection. Specific gynecological conditions which are commonly associated with hypoproteinemia are as follows:

1. In cases of exudative lesions there is great protein loss which should be made up.
2. Vaginal bleeding, due to any cause, often results in a deficiency of plasma proteins which cannot be corrected by blood transfusions alone.
3. Malignant tumors often result in a depletion of body proteins. A high protein intake is especially in order for individuals treated with large doses of radium or x-rays.
4. Not too infrequently one sees in practice the young woman who is thin and pale, and complains of dysmenorrhea and occasional menstrual irregularity. Usually the diet is deficient. Often the gynecological difficulty can be cured by correction of diet and adequate protein intake.

Return to normal of body proteins after depletion may be accomplished by the oral route with whole protein, orally with amino acids or hydrolysate protein, parenterally with whole plasma, blood, blood albumin, serum or gelatin, and by parenteral injection of amino acids.

## ESSENTIALS TO ADEQUATE GYNECOLOGIC PATIENT STUDY

A. L. DIPPEL

Texas State J. Med., 42: 417-422, 1946

The writer emphasizes the importance, to the patient and to good gynecologic practice, of adequate or complete patient study, and reviews the more common diagnostic aids. It is concluded that there appear to be no short cuts, and no means of circumventing thorough work-up of gynecologic cases without running the risk of missing the diagnosis and performing inadequate therapy or unnecessary surgery for the true condition and thereby endangering the immediate or the remote health of the woman with pelvic symptoms.

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# *Book Review*

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## THE PROBLEM OF FERTILITY

Edited by EARL T. ENGLE, Princeton, New Jersey

Princeton University Press, 1946, \$3.75

The proceedings of the conference on fertility of the National Committee on Maternal Health have been edited and published in a small volume which can be read with interest by anyone concerned with the physiology of reproduction. It presents a resumé of the problems of fertility in domestic animals and humans, devoting special attention to those factors concerned with ovulation, sperm transport and survival, and cervical mucus. As a number of the fifteen authors are active in the field of animal husbandry, their slightly different point of view and scope of literature are of added value to the medical research worker or clinician. Although most of the work included has been published elsewhere during the year of 1946, there is much to be gained by such a compact review and integration of diversified fields. The frank discussion of problems which follows each report gives an accurate impression of present day thought upon many controversial subjects and probably constitutes the most valuable contribution of the publication.

GEORGEANNA SEEGAR JONES

A case history of one of the less common causes of vaginal discharge is presented, and methods of treatment of leucorrhea are suggested.

(The character of the vaginal discharge is often suggestive of its source, but few would wish to draw such sharp conclusions concerning the etiology of the leucorrhea as do the authors of this paper. I for one would not be certain of Neisserian infection if a discharge is greenish and creamy, the vagina and cervix red and granular, with some urinary discomfort. I would be more inclined to think of trichomonas infection, especially as it is not infrequent for the latter to occur in women with previously existing cervicitis or erosion. I am sure, however, that the authors do not base their diagnosis on the general characteristics of the discharge, but, like the rest of us, make the proper diagnostic studies in an effort to determine the etiological factor. To their category they might have added that when a discharge is thick and mucoid, its cervical source can be assumed, although no conclusion can be drawn as to the organisms concerned.—Ed.)



women with no signs or symptoms of hepatic disease. The authors were able to demonstrate the regular presence of light and dark cells in all cases, normal as well as pathologic, and found that the occurrence of the large light cells in the liver is primarily dependent on the nature of the fluid used for fixation. They were regularly encountered in tissues fixed by formalin but were absent when certain other fixation fluids were used. A prerequisite to the presence of these contrasting light and dark cells is an abundant glycogen content of the cells. For this reason the large light cells are not encountered in autopsy specimens since glycogen disappears very rapidly after birth; the same is true in hyperemesis. As for any rhythmic changes associated with meals, the authors were unable to confirm this observation.

With the above studies as a background, the authors in their second paper consider the histological picture of the liver in normal pregnant women. Seventeen women, all but one primigravidae, were investigated by liver biopsy as well as by certain biochemical tests of liver function. No particular deviation from the picture found in normal nonpregnant women could be found although vacuolar accumulation of fat in the central part of the lobules appeared to be somewhat more pronounced during pregnancy. Their biochemical findings showed that gestation is associated with certain changes in the intermediate metabolism of the liver but they conclude with the statement that there is no basis, either on histological or biochemical grounds, to maintain the concept of "pregnancy liver."

The third paper, dealing with the liver picture in the toxemias of late pregnancy, may be divided into two parts: the picture in pre-eclampsia and that in actual eclampsia. In 6 patients with pronounced pre-eclampsia, the histological picture was quite the same as observed in the normal cases; in particular, no evidence of any degenerative changes could be detected in any case. Nor were any signs of fibrinous thrombi, hemorrhage or necrosis present. Frozen sections stained with Sudan III showed a few fat droplets in only one instance. A diffuse distribution was seen in all specimens. Cellular infiltrations or increased connective tissue was never encountered.

In 5 cases of eclampsia, liver biopsies in 2 revealed a picture quite the same as in normal women, but in 2 other cases the specimens presented changes characteristic of eclampsia as known from autopsy material. In 1 of these cases even the fresh specimen was grossly flecked, presenting small red spots and streaks in sharp contrast to the grayish-brown color of the tissue in general. Sections from this specimen showed scattered areas of coagulation necrosis which were extensive. These changes were localized especially in the periphery of the lobules where the capillaries in several places were filled with large or small thrombi of fibrin often appearing as an anastomosing network enveloping granular necrotic liver cells. The necrotic areas as well as the hemorrhages are presumably attributable to blocking of the peripheral capillaries with fibrin thrombi. These fibrinous precipitates are regarded by the authors as the essential histological feature of the hepatic lesion in eclampsia. In addition to this granular decomposition and necrosis, more or less pronounced degenerative

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# Obstetrics

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## PHYSIOLOGY OF PREGNANCY, LABOR AND PUERPERIUM

### BIOPSY STUDIES ON THE LIVER IN PREGNANCY

- I. NORMAL HISTOLOGICAL FEATURES OF THE LIVER AS SEEN ON ASPIRATION BIOPSY.
- II. LIVER BIOPSY ON NORMAL PREGNANT WOMEN.
- III. LIVER BIOPSY IN ALBUMINURIA OF PREGNANCY, ECLAMPSISM AND ECLAMPSIA.

MOGENS INGERSLEV AND GUNNAR TEILUM

(*Lying-In Department, Rigshospital, Copenhagen, Denmark*)

Acta Obstet. et Gynec. Scandinav., 25: 339-376, 1945

The authors recall that the histological picture of the liver in normal pregnancy is a subject of dispute. Thus the concept of "pregnancy liver" has been developed, characterized by central stasis of the bile, dilatation of the central vein and central accumulation of fat, a picture which Hofbauer claims is a constant occurrence. (*Zeitschr. f. Geburtsh. & Gynäk.*, 61: 200, 1908.) The improved technique of aspiration biopsy on the liver introduced by Iversen and Roholm (*Acta Med. Scandinav.*, 102: 1, 1939) has made it possible to carry out systematic histopathological studies on the liver without the drawback of post-mortem cellular changes inherent in autopsy studies; and offers the possibility of reevaluating the picture of the liver in pregnancy as it exists in living patients.

The first of this series of 3 papers deals with the normal histological picture of the liver as found on biopsy. This portion of the investigation was made desirable by the fact that our present knowledge of the cellular picture of the liver is somewhat defective. Thus, the question about the significance of certain cell types (light and dark cells) and the possible occurrence of assimilatory and secretory phasic changes as demonstrated by Forsgen in rabbits (*Über die Rhythmik der Leberfunktion*, Stockholm, 1935) has not been settled. The technique employed by the authors was puncture of the right lobe by a needle in the midaxillary line under ether or chloroform anesthesia. Aspiration of liver tissue by a syringe was then carried out. The biopsies were performed for the most part on fasting subjects. The procedure was never followed by alarming phenomena but more than half of the patients complained of pain for a few hours.

In 6 cases aspiration biopsy of the liver was performed on normal nonpregnant

## THE BLOOD IN PREGNANCY; PART I. THE HAEMOGLOBIN LEVEL

M. H. ROSCOE AND G. M. M. DONALDSON

J. Obst. &amp; Gynaec. Brit. Emp., 53: 430-439, 1946

The hemoglobin levels of pregnant women in one antenatal clinic were investigated in 279 cases in 1942 and in 180 cases in 1944. In 1944 the level of 92 women was followed throughout pregnancy. The ages of the women investigated in 1942 varied from 17 to 41; there were 165 primiparae and 114 multiparae. The ages of the women investigated in 1944 varied from 17 to 40; there were 107 primiparae and 73 multiparae.

In 1942 the hemoglobin level fell sharply in the first months and then more slowly to term. The mean level in the first trimester was 79.8 per cent Hb., in the second 75.6 per cent Hb., and in the third 72.5 per cent Hb. Women with 2 or more previous pregnancies exhibited lower levels than the others. Age did not affect the level.

In 1944 there was a fall in the hemoglobin level during pregnancy, but this was not so great as in 1942. The fall was proportional to the age of the women and was steady until the last few weeks; the level of the older women then rose, so that at term there was no significant difference between different age groups. Parity did not affect the hemoglobin level.

Two practical points emerge from these results. The first is of importance when the hemoglobin levels of different series of pregnant women are being compared. It has been shown that the hemoglobin level falls during pregnancy and that the fall may vary with age and parity. It is therefore impossible to obtain an accurate comparison of different series unless all these factors are taken into account.

TABLE IV. (From Roscoe and Donaldson)

*The expected haemoglobin levels in the different months of pregnancy and at different ages*

AGE, YEARS	HB. PER CENT, CALENDAR MONTHS								
	1	2	3	4	5	6	7	8	9
20	92	91	89	88	86	85	83	82	80
25	92	90	88	87	85	83	81	79	79
30	92	90	88	85	83	81	79	77	77
35	92	89	87	84	81	79	76	74	76

The second point is of interest to the obstetrician. The extent of the normal fall in hemoglobin level during pregnancy is still not definitely established, but it is suggested that the levels found in 1944 (shown in Table IV) approach the normal and may be used until supplanted. The standard deviation of the 1944 series of pregnant women, allowing for length of pregnancy and age, was 8 per cent Hb., while that of the hemoglobin level of 1115 single men was 9.02 per cent Hb. It therefore appears that the hemoglobin level can be predicted as

changes may also be present but this is not always true since in some cases the hemorrhagic and necrotic foci are the only findings. The authors were not able to demonstrate any greater fat content than in normal material. On staining for glycogen, the non-necrotic areas showed a normal glycogen content. The specimens from these eclamptic patients showed the same light and dark cells as were seen in normal cases. This histological picture has heretofore been interpreted as signifying degenerative changes, but as already indicated, the authors regard it as due to artefacts from formalin fixation. Finally, the authors note that their 2 patients with the severest hepatic changes survived quite satisfactorily. Hitherto such changes in the liver have been known to exist only in fatal cases.

(The status of the liver in normal pregnancy has long been the subject of debate with the evidence almost evenly balanced between those who claim that this organ shows no changes in normal gestation and those who maintain that it often manifests slight but significant diminution in function. The above histological observations are the first reported, as far as I am aware, on the liver picture as it actually exists in the living grávida. Although the authors conclude that there is no justification for the concept of "pregnancy liver," they do hedge a little bit here by admitting that there is a slightly increased vacuolar accumulation of fat in pregnancy and certain changes in the intermediate metabolism.

The many studies which have been made on the liver in pregnancy by means of functional tests were reviewed in detail somewhat over a decade ago by Cantarow, Stuckert and Gartman (*Am. J. Obst. & Gynec.*, 29, 36, 1935). These investigators reported also observations of their own on serum bilirubin levels and bromsulphalein retention tests in normal and toxemic gravidæ. They conclude that although serum bilirubin concentration remains within normal limits during normal pregnancy, some degree of hepatic functional impairment is present in a not inconsiderable proportion of cases. They make the further interesting observation that the ability of the liver to eliminate bromsulphalein is more readily impaired by anesthetic agents in the pregnant than in the nonpregnant state.

In this connection, why is it that some 60 per cent of all cases of acute yellow atrophy occur in pregnant women? These cases are uncommon, it is true, but this well known tie-up between acute yellow atrophy and pregnancy is a fact that it is difficult to explain away unless one postulated some kind of hepatic change in pregnancy in the direction of greater vulnerability.

If one were forced to take sides on this issue, the evidence would seem to me to lie a trifle in favor of the viewpoint that the liver in a certain proportion of pregnant women shows a slight diminution of function and appears to be somewhat more vulnerable to toxic agents. This, of course, is not so far away from the old concept of Hofbauer who, after reviewing the whole problem again in 1934, restated his conviction that "a definite, if slight impairment of liver function (insuffisance hépatique), with glycogen deficiency as its outstanding feature, is constant in a large percentage of normal pregnant women, particularly in the second half of pregnancy" (*Curtis: Obstet. and Gynec.*, W. B. Saunders Co., Vol. 1, Page 629).

The observations of Ingerslev and Teilum in their 5 cases of eclampsia—namely, 2 with characteristic hepatic changes and 3 without—fit in very well with the present-day concept that the classical "eclamptic liver" is by no means a constant finding in this disease. Not only may patients die of eclampsia with a perfectly normal appearing liver but, contrariwise, the characteristic peripheral necrosis of the liver lobule—long thought to be pathognomonic of eclampsia—may occur in other conditions. For instance, the most typical "eclamptic liver" which our pathological department possesses came from a young girl who, finding herself 6 weeks pregnant, took bichloride of mercury and died a fortnight later in our medical ward of uremia.—Ed.)

Postpartum blood volume values were obtained in 2 cases in this series and were considerably lower than the values in the same women during the first trimester of pregnancy. It would therefore appear that the increase in blood volume starts early in pregnancy and that the total rise is greater than that observed between the end of the first trimester and the last months.

The findings in this study may be employed to explain the changes in the hemoglobin level in the blood found in the 2 larger series of women reported on in the authors' previous paper. The hemoglobin level of the women fell steadily throughout pregnancy. It now appears that this fall was due to an increase in blood volume, the plasma increase being out of proportion to that of the hemoglobin. It also seems probable that the variation in blood hemoglobin level with age, in the larger series, was due to variation in the plasma volume.

In the series of women seen in 1942, and reported in the previous paper, the levels were lower all through pregnancy than in 1944, and it is suggested that this was due to the combined effects of plasma dilution and deficient hemoglobin formation. This is supported by the fact that in 1942 the women who had been subjected to the strain of repeated pregnancies had lower hemoglobin levels than had the primiparae. 1 figure.

(The above paper is the most recent of a number of painstaking studies which have been made during the past two decades on blood volume alterations in pregnancy; and to my knowledge, at least two other intensive investigations of the same problem are at present under way. Since previous studies agree in showing that the blood volume does increase in gestation, the question may well be raised as to why investigators continue exploring this field. Just what are the known facts; what further facts do investigators hope to ascertain, and just how are the results of these studies related to clinical obstetrics?)

It will be recalled that increase in blood volume is the greatest single alteration which the gravid organism undergoes, except of course for the primary fetal and uterine enlargement. Since the absolute augmentation of total blood mass is of the order of 25 per cent, the additional work imposed on the heart and vascular system is substantial and has been generally accepted as the cause for the aggravation of some cases of heart disease in pregnancy. But there are many facts about this important change which are not yet clear, for instance, the behavior of the blood volume in the last month of pregnancy and during the early puerperium. In one of the most careful studies of the subject, Thomson and his associates found that a definite decrease in total blood volume began in the 10th lunar month with the result that the blood volume at term was decidedly less than that a month previous (*Am. J. Obst. & Gynec.*, 56, 48, 1938). If this be true—and these investigators' results are very clear-cut and convincing—it means that patients with heart disease who complete the 9th lunar month without incident should be able to withstand labor satisfactorily because by that time a considerable decrease in blood volume and in the consequent cardiac load can be anticipated. Burton E. Hamilton and the group at the Boston Lying-in Hospital have emphasized this point repeatedly. The observations of Thomson and his associates are doubtless valid but they are of such great clinical importance that they need confirmation. If I am not mistaken, the findings of Dieckmann and Wegner did not show this 10th month decline in blood volume but rather a steady rise until term was reached (*Arch. Int. Med.*, 53, 71, 188, 345, 1934). The present study of Roscoe and Donaldson does not help us here since their last determinations were made in the 36th week.

Another aspect of this question which is still far from clear is the behavior of the blood volume in the early puerperium. One can often learn as much from the retrogression of a process as from its development. Day by day figures on the blood volume during the first

accurately in pregnant women as in other groups, provided the above factors are considered. 1 figure.

## THE BLOOD IN PREGNANCY; PART II. THE BLOOD VOLUME, CELL VOLUME AND HAEMOGLOBIN MASS

M. H. ROSCOE AND G. M. M. DONALDSON

J. Obst. & Gynaec. Brit. Emp., 53: 527-538, 1946

The present study was undertaken to investigate the extent of the variations in blood volume which occur during pregnancy, to discover how these variations affect the total amounts of hemoglobin and red blood cells, and whether their levels in the blood, under the new conditions, give any indications of their levels in the body.

The blood volume was estimated by the dye method (Evans blue) in 20 non-pregnant women and in 20 women 3 times during pregnancy. The blood volume in normal nonpregnant women was proportional to the body size, as measured by surface area, so that the concentrations of hemoglobin and cells in the blood were proportional to their concentrations in the body. The mean amount of blood per square metre of surface area was 2,660 ml.

The mean duration of pregnancy at which each of the 3 tests was made on 20 pregnant women was 12.4 weeks, 24.2 weeks and 35.6 weeks, respectively. Seventeen of the women were primiparae and 3 were multiparae. The ages varied from 20 to 39, mean 28.2 years. There was an increase in the blood volume between the first and third tests in every case, the mean values at the 3 tests being 4,300 ml., 4,900 ml., and 5,400 ml., respectively. The mean values of blood per square metre of body surface at the 3 tests were 2,700 ml./sq. m., 2,975 ml./sq. m., and 3,180 ml./sq. m. There was an increase of whole blood to supply the added maternal tissues, but there was also a further increase of plasma.

This disproportionate increase in plasma resulted in a fall of hemoglobin and cell concentration in the blood, but the normality of the resulting low levels was confirmed by the fact that the concentration of hemoglobin in the cells and the size of the cells remained within normal limits.

The amount of the increase in plasma during pregnancy was very variable, and in this series by the later months of pregnancy the levels of hemoglobin and cells in the blood reflected inversely the blood volume, rather than the level of these substances in the body.

Two cases of anemia occurring during pregnancy are reported, which illustrate how the changes in blood volume obscured the changes occurring in the solid blood elements. These cases show the difficulty of assessing the degrees of anemia in pregnancy from the blood hemoglobin level alone.

the most valid conclusions will be reached by following the same patients from month to month throughout pregnancy and from day to day in the puerperium. The practical difficulties in doing this are avowedly great but the wide ramifications of this subject and its many clinical relationships would seem to justify the attempt.—Ed.)

## THE ACTION OF ADRENALINE ON THE EXCISED HUMAN UTERUS: WITH A SHORT ADDITIONAL NOTE ON THE ACTION OF QUININE

J. A. GUNN AND C. S. RUSSELL

J. Obst. & Gynaec. Brit. Emp., 53: 205-211, 1946

The writers have tested excised strips of human uterine muscle for the effect of adrenaline and quinine.

It was found that the response of the non-pregnant uterus to adrenaline is one of stimulation. This is true also of minimal effective concentrations which are usually of the order of one in  $10^6$  or  $10^7$ . Muscle strips obtained in the first trimester of pregnancy showed a motor response to adrenaline in all concentrations above the minimal effective one which is of the order of one in 20 million. In 2 instances muscle strips were obtained at about the twentieth week of pregnancy. The response to adrenaline of one of these strips was weakly motor and that of the other was inconsistent. On 2 occasions in the latter case there was definite inhibition.

Previous experiments suggested that for a minimal response the muscle of the upper uterine segment requires a greater concentration of adrenaline of the order of 40 times greater than that necessary for the muscle of the lower uterine segment. In the present study, experiments on uterine muscle strips in the third trimester showed that a concentration of adrenaline which produced little or no effect on the muscle of the upper segment might produce a conspicuous motor effect on the muscle of the lower segment. In muscle strips obtained during labor there was no inhibition in any case, and often the motor effect was clear. Strips from the lower segment seemed more sensitive to adrenaline than those from the upper segment.

The experiments with quinine showed that when amounts of the order of one mg. were added to the bath containing 100 cc., there was often little or no response; with larger amounts the effect was one of inhibition or paralysis. When quinine and adrenaline were tested together the antagonism between the 2 substances was very marked.

If it is accepted that adrenaline has a motor effect on the lower uterine segment and that this effect is greater than on the upper segment, and if quinine actually antagonizes this effect, the authors state that one is almost forced to the conclusion that, under conditions of overaction of the sympathetic nervous system, quinine should be used during labor. 9 figures.

week of the puerperium are altogether wanting as far as I know, yet might well be of significance, especially in connection with the diuresis which is such a constant phenomenon of the 3rd and 4th postpartum days. Does this diuresis entail a prior mobilization of fluids from the tissues into the vascular system with a temporary increase of blood volume? Could this be the reason why patients with heart disease are especially prone to go into failure at this time? If so, would venesection help? All these questions need answer and could be answered by further work in this field.

Another problem which has interested and perplexed investigators is whether the increase in total blood volume associated with pregnancy is simply proportionate to the increase in body size, or whether it goes beyond that point. As may be deduced from the figures in the above abstract, Roscoe and Donaldson find that there is an increase of about 18 per cent in total blood volume per square meter of body surface, which means an 18 per cent increase in blood volume over and beyond that which might be expected from augmentation in maternal size. Their figure for absolute increase is 26 per cent. The often quoted figure of Dieckmann and Wegner of 22 per cent for increase in blood volume during pregnancy refers to absolute increase (disregarding increase in maternal size) and is obviously quite close to Roscoe and Donaldson's figure of 26 per cent. In this particular phase of the work an undeniable error is introduced by the size of the fetus. Since the dye ordinarily used in these determinations does not penetrate the placenta, the figures reported are for total blood volume of the mother only; however, in correlating this value with surface area, one is confronted with the circumstance that the fetus inevitably enlarges that area and hence there is some uncertainty about the complete validity of these calculations. Nevertheless, the figures of 25 per cent for absolute increase in blood volume during pregnancy and 18 per cent for relative increase (relative to body size) seem to be fairly well authenticated and are probably somewhere near the truth. It should be noted, however, that the corresponding figures of Thomson and his associates are much higher, namely, 45.5 per cent for absolute increase in total blood volume, and 25.2 per cent for increase per kg. of body weight.

Aside from the above problems relating to total blood volume, there is another major question in this field, namely: Do the two chief constituents of blood—cells and plasma—increase in volume proportionately during pregnancy, or does one increase more than the other? According to all investigators, most of the increase occurs in the plasma; but there is also a substantial augmentation of the total red cell mass, whether viewed absolutely or relative to body size. Thus, in the Roscoe and Donaldson study, the increase of total cell mass per square meter of body surface was 9 per cent. Recalling that the total relative increase in whole blood volume in this study was 18 per cent, it can be calculated that the increase in plasma volume must have been approximately 24 per cent per square meter of body surface. This is about the same that Dieckmann and Wegner found for absolute increase in plasma volume. Thomson and his associates reported much higher values, namely 65 per cent increase in absolute plasma volume and about 50 per cent for increase per kg. of body weight.

It is evident of course that the disproportionate increase in plasma described above is responsible for the well known blood dilution of pregnancy. This has sometimes been called the "pseudo-anemia" of pregnancy, but if this term is to be used, it would seem important to dwell chiefly on the "pseudo" part of it because, as we have seen, pregnancy is actually associated with an increase in total red cell mass and in total hemoglobin over and above that which might be expected from increase in body size. In this connection we will all remember the old contention that the average healthy gravida at term has some 500 cc. of blood "to spare," in order to meet postpartum hemorrhage. In the light of the above studies, this is not only true but is probably a slight understatement.

There is one point which all students of this subject make, namely, that various gravidæ show extreme individual variation in respect to changes in blood and plasma volumes. This is bound to find clinical reflection not only in a wide divergency in hemoglobin values as ordinarily reported but also in plasma protein figures. This also means, from an investigative viewpoint, that average values in this field are especially subject to error and that



the most valid conclusions will be reached by following the same patients from month to month throughout pregnancy and from day to day in the puerperium. The practical difficulties in doing this are avowedly great but the wide ramifications of this subject and its many clinical relationships would seem to justify the attempt.—Ed.)

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# CLASSIFICATION OF THE HUMAN PELVIS, WITH A PRELIMINARY NOTE ON THE EVOLUTION OF THE ANTHROPOID OR ULTRA-DOLICHOPELLIC TYPE OF PELVIS

O. S. HEYNS

J. Obst. & Gynaec. Brit. Emp., 53: 242-250, 1946

The Caldwell and Moloy view on the evolution of the human pelvis is that orthogenesis begins in lower mammals where the pelvic inlet is always longest in the anteroposterior axis (brim index over 100), and ends with platypelly found in man (brim index under 100). These authors assert that the occurrence of anthropoid type pelves (10 to 20 per cent) is due to an arrest of evolution. The present writer examines these assertions. For Caldwell and Moloy's hypothesis to mean anything, the picture would be a high incidence of "anthropoid type" pelves in fetus and embryo, a more human (possibly flattish) pelvis later during ontogeny, and at the end of ontogeny some more highly developed pelvis, which Caldwell and Moloy believe is their platypelloid type (a pelvis with an average brim index below 80). However, these authors reported an incidence of only 2 per cent for this type, and neither Bantu nor English incidence percentages rise above this figure.

In the adult there occurs, on the average, a flatter pelvis than in the child. The "anthropoid type" incidence is still equal to that in the fetus, though the "anthropoid" appearance reaches greater emphasis in the specimens so characterized. Something happens at pubertal age to arrest the development of round or ultra-dolichopellic brims, but the basis for this is not evolution. The cause may be factors concerned with sex hormones, the influence of nutrition on metabolism, and physical forces based on weight-bearing and progression.

It is of importance that Kenny's paper has established the belief that the "anthropoid" type pelvis in women is associated with a minimum of dystocia, and if it is assumed that difficult labor may jeopardize continuation of the species, then only pelves favorable to easy expulsion of the fetus would evolve.

The available evidence contradicts the Caldwell *et al.* belief that the ultra-dolichopellic pelvis represents an arrest in an evolutionary movement which has platypelly as its purpose.

The view advanced in this paper is that the evolutionary purpose in man is to produce the "anthropoid type" of pelvis. The results of the study were as follows:

## 1. Mean values of ilium/pubes index.

50 adult female	100.92
40 adult male	103.30
90 combined adult	102.39 Adult
39 age 15-19 years	82.92 Adolescent
43 age 1-15 years	89.34 Child

The difference for the means of the Adolescent and Child groups was  $6.42 \pm$

2.66, the difference being 2.41 times the standard error and, therefore, probably significant. When compared with the Adult mean, both the Adolescent and Child means reveal highly significant differences.

$$\begin{aligned} \text{Adult and Adolescent—Difference} &= 19.47 \pm 1.935 \\ &= 10.05 \times \text{st. error} \\ \text{Adult and Child —Difference} &= 13.05 \pm 2.42 \\ &= 5.39 \times \text{st. error} \end{aligned}$$

## 2. *Percentage incidence of indices 100 and over.*

Only 2 adolescent pelves had an index of 100 or over, and 9 childhood pelves. In the adult, 29 out of 40 (72.5 per cent) males had the index 100 or over, and the corresponding figures for the female were 32 out of 50 (64 per cent). This difference signifies greater length of the pubic portion of the iliopectineal line before the age of 20 years, and greater length of the iliac portion in the adult. It is suggested that the adult tendency is not only to have a higher index than in individuals under 20, but to be over 100 when the latter are characteristically under 100.

## PHYSIOLOGY OF LABOR

R. TORPIN

Am. J. Obst. & Gynec., 53: 78–81, 1947

Woodbury and associates, working with obstetrical patients, have made records of simultaneous continuous pressures of the following: intrauterine pressure above the fetal head or below the fetal head; the stomach pressure; the maternal intra-arterial pressure; and intravenous pressure.

During the first stage of normal labor the intrauterine pressure rises with each contraction to a peak of 35 to 60 mm. Hg., then falls to the uterine tone pressure of 5 to 8 mm. Hg. In the second stage after full cervical dilatation, the apex of each contraction may rise to a maximum of 110 mm. Hg. and the "intercontraction" tone remains higher at 10 to 12 mm. Hg. The combined pressures caused by the uterine muscle and the abdominal muscles in the second stage may reach 260 mm. Hg. The pressure within the placenta causes the maternal blood to be squeezed out during the uterine contraction, usually into the vena cava. The effect is naturally greater if the maternal blood pressure is low. This action, by throwing about a pint of blood back upon the maternal circulation at each contraction, raises the venous pressure approximately 10 mm. Hg., and may be a factor in the danger of labor in decompensating cardiac patients.

During the first stage of labor, the pressure changes affect equally the entire fetus as well as its placental circulation, and it is practically without damage unless something obstructs the oxygen and metabolites' supply to the fetal blood. In the second stage only is there greater pressure above the fetal head than below

it, but this is intermittent and allows for adequate oxygenation of the fetal blood.

During the course of study, patients were found who had the so-called dystocia dystrophy syndrome. Such patients often have the characteristics of pituitary dysfunction (increased weight, short stature, short and stubby fingers, etc.). When pregnant, they are more often subject to abnormal weight increases with attendant inclination to toxemia. In these women, the abnormality of labor was found generally to be due not to pelvic alterations, but to altered physiology of the uterine contractions. The onset of this altered physiology is earlier if labor is poorly managed. Contraction waves are shorter, more peaked, and of variable amplitude and recurrence. Of such importance as to be almost pathognomonic is the fact that the intercontraction tone remains much above normal rising to 15 to 18 mm. Hg. or more. This results in the fetus becoming hypoxic and in ineffectiveness of contractions because of lack of blood and oxygen in the uterine wall.

The only anesthetic drug with the ability to abolish in most cases the abnormal contractions with the intervening elevated intrauterine pressure was morphine. Furthermore, this drug had no effect upon normal labor contractions after they had already been established. It frequently changed abnormal labor into normal labor, the cervix beginning to dilate and spontaneous delivery following.

Besides the constitutional type of patient subject to dystocia dystrophy syndrome, it has been discovered that any patient in labor may be thrown into similar abnormal type of labor by repeated administration of oxytocic drugs; the intercontraction tone rises with repeated doses until complete tetany exists.

It was found that in certain cases of toxemia with hypertension, large weight gain, edema, often associated with dehydration and anemia, there may be development of this abnormal type of labor.

## THE EFFECTS OF LACTATION ON THE POSTPARTUM INVOLUTION OF THE UTERUS OF THE CAT

A. B. DAWSON

Am. J. Anat., 79: 241-266, 1946

The writer found no significant differences in the early involution of the uterus of the cat in non-lactating and lactating animals. However, in both instances there was a striking difference in the behavior of the myometrium and of the endometrium. The myometrium was progressively reduced in volume, while the endometrium was gradually reconstituted. These early changes were completed by the end of the second week, and thereafter the differential effects of the maintenance of lactation became obvious.

In non-lactating animals retrogressive changes ceased in the myometrium and the endometrium rapidly developed into a typical resting condition with numerous uterine glands, due to the liberation of estrogen from growing ovarian follicles.

When lactation was maintained retrogressive changes continued in the myometrium while the endometrium during the third week was further thickened and acquired additional uterine glands. After the beginning of the fourth week both myometrium and endometrium exhibited progressive involution, these regressive changes continuing until lactation ceased. The uteri at this time closely resembled those of animals castrated for similar periods. Two degrees of uterine involution are recognized: the normal involution of non-lactating animals and the hyperinvolution induced by prolonged lactation. It is thought probable that the uterus is not directly affected by stimulation of the nipples, but that the mechanism is neuro-hormonal, mediated by way of the hypophysis and the ovary. 3 plates.

# MANAGEMENT OF NORMAL PREGNANCY, LABOR AND PUERPERIUM

## A DIETARY SURVEY OF PREGNANT WOMEN AND SCHOOL CHILDREN IN EDINBURGH

M. H. ROSCOE AND H. S. MCKAY

Edinburgh M. J., 53: 565-573, 1946

A survey made by Davidson *et al.* of hemoglobin levels in Edinburgh in 1942 showed that pregnant women and school children exhibited a considerable incidence of anemia. The present study was undertaken to discover whether deficient diet in these groups might be responsible for the anemia.

The diets of a series of 35 expectant mothers and 52 school children in 1944 and 1945 were studied by the individual method. The food, as eaten, was weighed and recorded by the women and children's mothers for a week, and from these records the week's consumption of nutrients was calculated with food tables. Since the method requires reliable women, the subjects were not a random sample, but a group of the more intelligent and better off.

The intakes of each nutrient were compared with the amounts suggested as requirements for pregnant women and children by the National Research Council. The mean consumption by women and children of calories, protein, animal protein and fat was as high or higher than the suggested requirements. The mean intake of iron of the women was slightly less than the suggested requirement, but that of the children was adequate. The range of intake of these nutrients by both women and children was large. The amounts of fat, protein and carbohydrates eaten by both groups varied with caloric intake. Fifteen women consumed less than 85 g. protein daily; 5 children had a protein intake of less than 65 g. daily.

In the summer most of the women obtained 50 mg. of ascorbic acid a day, but few got this amount in winter and spring, even when orange juice was taken. Approximately half the children seen in the summer and autumn obtained 30 mg. of ascorbic acid daily, but in the winter only with oranges was this amount obtained.

It is clear from these surveys that it was possible in 1944 and 1945 for both expectant mothers and school children to obtain a diet which supplied adequate amounts of calories, protein, fat and iron. A considerable number in both groups had higher intakes of these nutrients than are considered necessary. This suggests that there was little difficulty in obtaining a good diet when rations and priorities were used and unrationed foods bought intelligently. Rationing has probably improved the nutrient value of diets such as these by limiting sugar intake.

At the same time it appears that while few children obtained less calories, protein or iron than the suggested requirements, a high proportion of the women obtained considerably less. It is apparent that the chief cause was the failure

of these women to make use of their cheese ration and their priority rations of milk and dried eggs. In each case, custom was against a larger consumption. It appears, therefore, that improvement in the diet depends upon education, rather than supply of other foodstuffs.

The chief changes in the foods available for pregnant women between 1942 and 1944 were the change in extraction of flour from 70 per cent to 85 per cent, the introduction of orange juice and cod-liver oil in December, 1942 and of an extra half-ration of meat and half-packet of dried eggs per week in July, 1943. The difference in the extraction of flour would have made a mean difference in iron intake of 2.6 mg. daily for the women here investigated, and may have been one reason for the alteration in the incidence of anemia. This change in the extraction of flour would have affected the children's diets rather more than the women's. A further change in the children's diets which occurred during the 2 years was that the drinking of school milk became more universal.

## THE NUTRITION OF EXPECTANT AND NURSING MOTHERS IN RELATION TO MATERNAL AND INFANT MORTALITY AND MORBIDITY

(THE PEOPLE'S LEAGUE OF HEALTH)

J. Obst. & Gynaec. Brit. Emp., 53: 498-509, 1946

A total of 5022 pregnant women enrolled at antenatal clinics were investigated in order to consider the influence of nutrition on maternal and infant mortality and morbidity. In all cases there was an interval of 16 or more weeks between the beginning of research and the date of delivery. These women were divided into 2 groups by placing them alternately on separate lists; the first group received dietary supplements (treated), while the other group served as controls. Within each of these groups the women were further divided into primiparae and multiparae, and again these groups were subdivided according to age: women under 25; women between 25 and 30 years; and women over 30. There were in the treated group 1530 primiparae, and in the control group 1513 primiparae. In the treated group there were 980 multiparae, and in the control group 999 multiparae.

The diagnosis of toxemia was based on albuminuria, edema, etc., with or without, but generally with, hypertension. On this basis the treated primiparae had an incidence of toxemia of 5.4 per cent, while the primiparae in the control group had an incidence of 7.4 per cent. The figures for the parous group were 3.6 and 5.2 per cent, respectively. These results indicate that the women receiving the special diet are protected against the risk of toxemia in a ratio which is almost 30 per cent. In the primiparae of all ages the percentage of toxemia in the treated primiparae was significantly lower than in the controls, the respective figures being 27.1 and 31.7 per cent. However, in the older and younger age groups the difference was statistically unimportant. In the "all ages"

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A survey made by Davidson *et al.* of hemoglobin levels in Edinburgh in 1942 showed that pregnant women and school children exhibited a considerable incidence of anemia. The present study was undertaken to discover whether deficient diet in these groups might be responsible for the anemia.

The diets of a series of 35 expectant mothers and 52 school children in 1944 and 1945 were studied by the individual method. The food, as eaten, was weighed and recorded by the women and children's mothers for a week, and from these records the week's consumption of nutrients was calculated with food tables. Since the method requires reliable women, the subjects were not a random sample, but a group of the more intelligent and better off.

The intakes of each nutrient were compared with the amounts suggested as requirements for pregnant women and children by the National Research Council. The mean consumption by women and children of calories, protein, animal protein and fat was as high or higher than the suggested requirements. The mean intake of iron of the women was slightly less than the suggested requirement, but that of the children was adequate. The range of intake of these nutrients by both women and children was large. The amounts of fat, protein and carbohydrates eaten by both groups varied with caloric intake. Fifteen women consumed less than 85 g. protein daily; 5 children had a protein intake of less than 65 g. daily.

In the summer most of the women obtained 50 mg. of ascorbic acid a day, but few got this amount in winter and spring, even when orange juice was taken. Approximately half the children seen in the summer and autumn obtained 30 mg. of ascorbic acid daily, but in the winter only with oranges was this amount obtained.

It is clear from these surveys that it was possible in 1944 and 1945 for both expectant mothers and school children to obtain a diet which supplied adequate amounts of calories, protein, fat and iron. A considerable number in both groups had higher intakes of these nutrients than are considered necessary. This suggests that there was little difficulty in obtaining a good diet when rations and priorities were used and unrationed foods bought intelligently. Rationing has probably improved the nutrient value of diets such as these by limiting sugar intake.

At the same time it appears that while few children obtained less calories, protein or iron than the suggested requirements, a high proportion of the women obtained considerably less. It is apparent that the chief cause was the failure



# PATHOLOGY OF PREGNANCY

## HEART DISEASE IN PREGNANCY

B. E. HAMILTON

J. Missouri M. A., 44: 17-21, 1947

This presentation is based on the author's experience for approximately 25 years in continuous charge of a heart clinic at the Boston Lying-In Hospital.

Ninety-five per cent of the cardiac cases have rheumatic heart disease, and 17 out of every 1000 women that come to the Boston Lying-In Hospital have rheumatic heart disease, not including those who have had rheumatic fever and recovered without severe heart damage. These 17 out of 1000 have contributed to maternal deaths at the rate of 140 out of every 1000 deaths. The problems of pregnancy and associated heart disease are therefore important to the obstetrician.

It is best that the cardiac patient know her risk for pregnancy before becoming pregnant; hence the importance of school, health and premarital examinations. Regular examination of the cardiac patient should continue after marriage, since her status may change at any time.

Women with minimal or no signs of rheumatic heart disease are divided into the following groups: (1) Favorable Cases.—These are able to lead reasonably normal lives without heart symptoms and have no defects other than the heart disease. Their maternal death rate is approximately 2.5 per cent, or about 5 per cent higher than their annual death rate when not pregnant. Twelve per cent fail to have a living child after the pregnancy. (2) Unfavorable Cases.—These have had heart failure while leading normally active lives or have a complicating defect such as hypertension in addition to their heart disease. Their maternal death rate is approximately 16 per cent. Their annual death rate when not pregnant is approximately 7 per cent. They have about an even chance of producing a living child at the end of pregnancy. Unfavorable cases that have auricular fibrillation have a maternal death rate of nearly 33 per cent and about an even chance of having a living child. Their death rate per annum when not pregnant is about 8 per cent.

Some of the factors that modify advice to individual cardiac patients are discussed. The youngest and the oldest patients do not do as well as the others; the prudent cardiac patient will plan her pregnancies between the ages of 23 and 35 years. Those patients who have free aortic regurgitation cannot be protected against sudden heart failure as well as those having typical mitral stenosis. Those having both of these valve involvements behave like those with mitral stenosis alone. The most favorable cases are those that have merely moderate heart enlargement and a loud apical systolic murmur, no diastolic murmur. Generally, the larger the heart, the more chance for congestive failure. However, the

group of multiparae the incidence of 21.8 per cent in the treated group equalled that of the controls, and in 2 out of 3 specific age groups they were, if anything, at a disadvantage.

The incidence of sepsis among the total primiparae was about 4.5 per cent as compared with 2.2 per cent among the multiparae, an excess of about 100 per cent. The incidence increases with age for primiparae, the rates being 3.3 per cent (under 25); 5 per cent (25-30); and nearly 6 per cent (over 30). Results for multiparae showed no such correlation. There was no satisfactory evidence in favor of treatment. There was a well-defined seasonal trend in the incidence of sepsis in primiparae, the rate during October-March being 5.3 as compared with 3.5 during April-September. Only among the controls for multiparae was the seasonal factor demonstrated. When the data were classified according to duration of treatment and compared with those for the controls, no apparent divergence was noted.

As regards duration of labor, at "all ages" there was no significant difference between the treated and the controls. The only difference noted in the individual age groups was in primiparae 30 and over, where a difference of 3.3 hours in favor of the treated group almost approaches significance.

The length of pregnancy is analysed under 40 weeks, exactly 40 weeks and over 40 weeks. Of the primiparae, 20.1 per cent of the treated group were under 40 weeks, as compared with 23.9 per cent of the controls, and 69.3 per cent of the treated group were exactly 40 weeks, as compared with 65.5 per cent of the controls. Among the multiparae, the percentages under 40 weeks were 20.1 (treated) and 24.2 (controls), and the percentages at exactly 40 weeks were 68.8 (treated) and 65.7 (controls). These differences are significant, and are of special importance in that about 50 per cent of infant deaths under one month are due to prematurity.

Of the primiparous women aged under 25 years, 90 per cent breast fed their babies as compared with 76 per cent of the mothers aged 30. Among the youngest primiparae the controls had a statistically better record than the treated. For women of other ages the results were absolutely identical. If the age group 30 and over is taken as the one in which malnutrition is most likely to occur because of the existence of a large household, the controls are found to have a better record than the treated. Although the percentage of children breast fed increased with extended treatment, it was only when the mothers had received a supplementary diet for 24 weeks and over that their ability to breast feed was slightly better than that of the controls. There was a wide range in the percentage of breast feeding in different hospitals, suggesting that the incidence of breast feeding is to a large extent determined by factors such as hospital practice and discipline.

In the primiparous group, the percentage of stillbirths among the treated women was 2.4, and among the controls, 3.1. The percentage of neonatal deaths in the treated group was 1.3, and among the controls, 0.8. In the multiparous group, the percentage of stillbirths among the treated women was 2.0, and among the controls, 2.2. The percentage of neonatal deaths in the treated group was 1.4, and among the controls, 1.2.

heart failure. In search for early signs of congestive failure, the writer listens weekly for persistent rales at the lung bases. If a patient has no rales and no breathlessness, the possibility of heart failure can be dismissed until the next visit. Weight gain nearly always precedes congestive heart failure. When a cardiac patient has once failed and is on a strict regimen, the author directs her to record the weight every morning, and to report a gain of more than 3 pounds.

The treatment of congestive heart failure is the same in pregnancy as under usual conditions, except for the fact that the pregnant woman with heart disease is sensitive to fluid administration. The writer is inclined not only to give a low sodium intake, but also to restrict fluids.

Women with hypertension are no better off than those with rheumatic heart disease. Furthermore, one cannot reassure those with essential hypertension as one can assure those with rheumatic heart disease that if they survive pregnancies they have not shortened their lives. Some suspect that there is a tendency for pregnancy to hasten the progress of hypertension. It is suggested that, from many angles, hypertension in general and in particular in relation to pregnancy badly needs study.

In concluding this article, the author states that reduction of maternal mortality among cardiac patients to the minimum requires a great deal of time and money per patient, and he feels that public or private money, spent to improve maternal care, should be provided in adequate, and this means proportionately large, amounts for handicapped patients.

## COMPLETE HEART BLOCK IN PREGNANCY (REPORT OF TWO SUCCESSFUL DELIVERIES)

T. J. QUINTIN

Canad. M. A. J., 55: 600-601, 1946

Complete heart block complicating pregnancy is so rarely seen that the presentation of a case appears warranted. Jensen (1938) found only 14 cases recorded in the literature. Complete heart block is comparatively rare even in a general series of patients with cardiac signs or symptoms, White having found only 79 cases among 10,000 patients. None of the causes listed by him could be proved in the present case. Most of the cases of complete heart block in pregnancy have been delivered by cesarean section. In the author's case the patient had 2 normal deliveries.

This patient was first seen at the age of 26 years, when a laparotomy was performed to determine the cause of right lower quadrant pain and tenderness. Her record showed that in the past she had had some undetermined "heart trouble." There were no symptoms that could be related to the cardiovascular

writer cautions that no one should think he can predict closely how any individual heart will behave during pregnancy.

By plotting the time in pregnancy when cardiac patients who developed heart failure, first developed heart failure, it was found that few had congestive heart failure before the sixth month, failures clustered in the seventh and eighth calendar months, few failed during the ninth month and few at term or after delivery. Study of the circulatory changes in normal pregnancy has shown marked changes in the circulating blood volume, a rise of nearly 50 per cent. With this there is a moderate blood dilution. There is increased oxygen consumption and an increased cardiac output. These and other observations show the load on the circulation in pregnancy.

This load may affect the cardiac patient slowly or suddenly, between weekly visits to the physician; the evidences may disappear in a week or two. Therefore, the physician should watch the patient closely, see her at least once a week throughout pregnancy and instruct her to report if signs of respiratory or circulatory embarrassment appear. Although the time and duration of the load may vary considerably with individuals, all normal cases show evidence of the load before the end of the eighth month and a lightening of the load during the last calendar month. Experience has taught that "if failure appears for the first time before the sixth month or after the eighth, or at or after delivery (1) it is not heart failure; (2) if it is heart failure, there must be some complication of the pregnancy."

It is most important not to interrupt cardiac patients because of their heart condition after the load of pregnancy becomes heavy. Even when the patient is in severe heart failure in the sixth month, it appears safer to nurse her along and wait for the expected improvement following diminution of the load on the circulation in the last 4 weeks. If cardiac failure occurs because of a complicating condition such as toxemia and interruption is indicated to remove the toxemia, then interruption should be done.

The author discusses the curve showing maternal mortality at the heart clinic for the last 20 odd years. The death rate among cardiac patients fell from 15 and 20 per cent, where it had been for at least 8 years before the clinic was started, to around 3 per cent, and has dropped still further. This improvement coincides with the development of rules for the care of cardiac patients and facilities for application of the rules. An important factor is treatment, and the ability of the patient to take advantage of treatment.

Proper care for the average "favorable" cardiac patient requires access to the hospital for the patient at any time; control of weight and nutrition; a daily regimen so that she expends the same amount of energy every day; warning against holidays, visitors, moving, housecleaning, etc.; and seeing her every week. If signs of congestive failure appear she should be put to bed under hospital conditions and closely observed until delivered. If she does not show failure, but shows signs of embarrassment of circulation and respiration that are normal in pregnancy, her expenditure of effort should be reduced.

Normal pregnancy causes many signs and symptoms that suggest congestive

After considerable discussion of this case with our cardiologists, therapeutic abortion was performed, chiefly because of the 12 Stokes-Adams seizures, some of which were prolonged and severe. If the stroke volume of this patient's heart in the nonpregnant state had on 12 occasions been unable to meet the demands of cerebral metabolism, it seemed to us that to impose upon it the 50 per cent increase in minute output entailed by pregnancy—which in this case meant a 50 per cent increase in stroke output—would probably be more than the cardiac muscle could stand, with heart failure as a very likely sequela. It is true that a number of women with complete heart block have gone through pregnancy satisfactorily and Quintin's patient quite obviously went through two without major difficulty. These are women, however, with good reserve and little or no evidence of cardiac insufficiency. In our case the evidence seemed abundant that the patient's functional reserve was almost nil; and it is upon this functional capacity of the heart of course that the prognosis in all types of cardiac disease depends.—Ed.)

## ATYPICAL VALUES AND CURVES IN GONADOTROPHIC DETERMINATIONS OBTAINED DURING GESTATION AND IN RELATED CONDITIONS

SILVESTRE L. SALA

La Semana Médica, Nov. 22, 1946

The author reviews cases of his own and those of other investigators where he finds exceptions to the usual values and curves of gonadotrophic determinations obtained in case of pregnancy or in the presence of related conditions. He feels that although these cases are deviations from the normal they have an importance of their own by virtue of their frequency and clinical bearing.

In a previous report he gave the values universally accepted for the various possible gravid conditions. In the present article he cites the exceptions or deviations from the accepted values: In normal pregnancy the values of circulating gonadotrophins may be: (a) from zero (with negative reaction) to (b) excessive, with values corresponding to the presence of hydatid mole or chorionic epithelioma.

Particularly significant are the cases in which normal pregnancy follows the expulsion of a mole in view of the diagnostic error which may result. Kobak (The interpretation of excessive gonadotrophic hormones excreted in the urine in early pregnancy. J. A. M. A., 110: 1179, 1938) reports one such case where he found a value of 150,000 units per liter of gonadotrophin.

The following personal observation is added: A woman 5 months pregnant with clinical signs suggestive of a mole, expelled a hydatid mole on October 11 and evacuation was completed by curettage. There was no subsequent metrorrhagia and her condition in general was excellent. Amenorrhea persisted and on February 16 she returned with signs of pregnancy corresponding to a 2½

system, and there was no history of diphtheria or rheumatic fever. Her pulse rate was 64, and there were pre-systolic and systolic murmurs in the mitral area. Her recovery from laparotomy (under spinal pontocaine anesthesia) was uneventful.

When next seen a year later the patient was 8 months' pregnant. During the time she was under antenatal supervision, no untoward signs were observed apart from slight edema of the legs. She was delivered at full term under nitrous oxide, oxygen and ether anesthetic, with no complications. The pulse rate during her hospital stay dropped as low as 36 and varied up to 70 per minute.

Her second pregnancy occurred in the following year. When seen at about the fifth month, her pulse rate was 34 at rest and 44 after exercise, and remained the same on subsequent examinations. The blood pressure was 110/70. The heart showed some enlargement, and there was a loud systolic murmur to the left of the sternum. Moderate edema of the legs was the only other remarkable physical finding.

The electrocardiogram showed complete auricular ventricular dissociation. The patient's only complaint during the 2 months preceding delivery was some shortness of breath if she hurried upstairs. Sudden changes of position, from a stooping to an erect position, caused dizziness; ephedrine did not help this. Atropine produced no effect on the pulse rate.

Normal delivery was accomplished under nitrous oxide, oxygen anesthesia, with a full term child. Recovery was very satisfactory. An electrocardiogram taken 8 weeks postpartum showed the complete heart block still persisting. 1 figure.

(Complete heart block is such a rare complication of pregnancy that any well studied case, such as the above, is deserving of report. The rarity of this condition in pregnancy is shown not only by the fact that Jensen in 1938 could collect only 14 cases from the literature, as noted above, but also by the statement of Burton E. Hamilton that in his 20 years as cardiologist to the Boston Lying-in Hospital he had encountered only 2 cases (The Heart in pregnancy and the Child Bearing Age, Little Brown and Company, Boston, 1941, Pages 374-376). The infrequency of heart block in pregnancy is understandable when it is noted that the condition is twice as frequent in men as in women and that 90 per cent of the cases are seen in persons over 50.

My own experience with heart block in pregnancy is limited to a single case. The patient was a 36 year old white multipara, 8 weeks pregnant, who was referred to our clinic from another hospital in a state of unconsciousness. She regained consciousness shortly after admission and the following history was obtained. She had enjoyed good health until two years previously when she suddenly fainted while at work. She was taken to a hospital in a state of unconsciousness where a diagnosis of complete heart block was made. During the ensuing 22 months she suffered 11 more similar attacks of unconsciousness, had to limit her activity greatly and was only comfortable at night with 2 or more pillows. During the course of this period she had been a patient in various Baltimore hospitals where numerous electrocardiographic studies were made. They all showed complete auriculoventricular dissociation, a ventricular rate of about 32 which never exceeded 36, and an auricular rate of 72 to 76. The P-R interval ranged between 0.20 and 0.84 second. The ventricular rate of 32 could be affected neither by atropine nor exercise. No etiologic factor could be established, but evidence of various sorts indicated that the heart had been normal before the first Stokes-Adams attack 2 years prior to the present admission. There was a history of an uncomplicated, full term delivery 5 years previously.

After considerable discussion of this case with our cardiologists, therapeutic abortion was performed, chiefly because of the 12 Stokes-Adams seizures, some of which were prolonged and severe. If the stroke volume of this patient's heart in the nonpregnant state had on 12 occasions been unable to meet the demands of cerebral metabolism, it seemed to us that to impose upon it the 50 per cent increase in minute output entailed by pregnancy—which in this case meant a 50 per cent increase in stroke output—would probably be more than the cardiac muscle could stand, with heart failure as a very likely sequela. It is true that a number of women with complete heart block have gone through pregnancy satisfactorily and Quintin's patient quite obviously went through two without major difficulty. These are women, however, with good reserve and little or no evidence of cardiac insufficiency. In our case the evidence seemed abundant that the patient's functional reserve was almost nil; and it is upon this functional capacity of the heart of course that the prognosis in all types of cardiac disease depends.—Ed.)

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The author reviews cases of his own and those of other investigators where he finds exceptions to the usual values and curves of gonadotrophic determinations obtained in case of pregnancy or in the presence of related conditions. He feels that although these cases are deviations from the normal they have an importance of their own by virtue of their frequency and clinical bearing.

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Particularly significant are the cases in which normal pregnancy follows the expulsion of a mole in view of the diagnostic error which may result. Kobak (The interpretation of excessive gonadotrophic hormones excreted in the urine in early pregnancy. *J. A. M. A.*, 110: 1179, 1938) reports one such case where he found a value of 150,000 units per liter of gonadotrophin.

The following personal observation is added: A woman 5 months pregnant with clinical signs suggestive of a mole, expelled a hydatid mole on October 11 and evacuation was completed by curettage. There was no subsequent metrorrhagia and her condition in general was excellent. Amenorrhea persisted and on February 16 she returned with signs of pregnancy corresponding to a 2½

months gestation and with positive Friedman test. Suspecting a normal pregnancy, quantitative determinations were carried out and a value of 25,000 units per liter of urine was obtained. Subsequently she did well and normal delivery occurred in due course of time.

Therefore, with high gonadotrophin values the possibility of normal pregnancy must be excluded before accepting the diagnosis of hydatid mole or of chorionepithelioma. Because of this, some workers have raised the range for normal pregnancy up to 30,000 units per liter of serum.

With intrauterine fetal death, gonadotrophins may disappear very slowly, or remain in substantial amounts for two to three months after expulsion. In a case of this type, five and one-half months pregnant, and suffering from Parkinson's disease, the pregnancy was terminated by Boero's puncture method. The death of the fetus was verified clinically and expulsion was induced by use of oxytocics fifty-eight days after the puncture. Up to that time the Friedman test continued positive.

Vesicular mole alone may produce either a scant amount or no gonadotrophin: 200, 2000 to 10,000 units have been recorded. Evacuation of a mole with benign course frequently produces a prolonged period of low titer, suggesting the possibility that some tissue is retained. After malignant degeneration of a mole and its expulsion, the titer is usually negative. Yet there are cases on record of prolonged positive reaction after discharge of this type of mole also. The amounts are low, ranging from 100 to 1000 units, chiefly coincident with a metrorrhagia.

An example of this phase was noted in a case evidencing signs of molar pregnancy, who after six months gestation, spontaneously expelled a vesicular mole. Metrorrhagia persisted for a month, then decreased gradually, disappearing in 3 more weeks. Three Friedman tests were made during this period: the first, six days after evacuation was strongly positive; the second, at the end of one month registered 5000 units; the third, after hemorrhage had ceased, was definitely negative. One month later on, there was renewed metrorrhagia of ten days' duration. Gynecological examinations were continually negative. The Friedman test was positive on two trials during this second metrorrhagia. At its termination the gonadotrophin titer was 200 to 1000 units, and ten days later, also positive. Two weeks after that, still positive, and finally negative continuously after another week.

When chorionepithelioma is involved, the gonadotrophin curve descends to zero, then rises to a low level. Faintly positive reactions do not invalidate the presumption of chorionepithelioma. And definitely negative reactions can also occur in such a condition.

Reasons for these paradoxical findings may be attributed to: 1. Poor test animals; 2. A very small nodule and hypoactivity of the placenta; 3. Insufficient absorption of gonadotrophins because of extremely thick surrounding connective tissue or necrobiosis of the nucleus; 4. Inefficient renal filtration or destruction at this stage of placental hormones.



A SURVEY OF THE RELATION BETWEEN EPILEPSY  
AND PREGNANCY

C. W. F. BURNETT

J. Obst. &amp; Gynaec. Brit. Emp., 53: 539-556, 1946

The literature of epilepsy complicating pregnancy, labor, the puerperium and lactation is reviewed. It has been noted that menstruation and the menopause are sometimes closely associated with the occurrence of fits. A remarkable case was that of Filia, in which a breast-fed infant had convulsions only when its mother was menstruating. Marriage does not usually change the frequency of the fits, although fits may be induced by the strong emotion involved in coitus. Most writers agree that epilepsy usually has no effect on pregnancy. As to the effect of pregnancy on epilepsy, different writers have made widely different statements. Rubeska probably is as near the truth as anyone when he considers that  $\frac{1}{3}$  of the cases improve,  $\frac{1}{3}$  become worse and  $\frac{1}{3}$  remain unchanged. Numerous cases are recorded in which convulsions first occurred during pregnancy. Labor and the puerperal and lactation periods may be responsible for the onset of fits and for the relapse of an apparently cured case.

The records of 19 pregnancies in 16 epileptic mothers, which occurred at the West Middlesex Hospital from 1939 to 1945 are presented for analysis. In only one case was there a family history of epilepsy, and none of the babies showed evidence of inheritance.

In only 4 of the 16 cases did the fits begin during the "dangerous epoch" (11-15 years of age). Four cases of menstrual epilepsy were encountered, of which 3 became worse during pregnancy. In 2 cases the fits began during a pregnancy and have continued since delivery, not associated with menstruation. Including these 2 cases, 8 cases became worse during pregnancy, one was improved and 10 were unaffected. The presence or absence of toxemia (edema, blood pressure above 130/70 or albuminuria) was noted in each case. In 6 cases one or more of these signs was present; in 13 they were absent. In 3 of the 6 toxemic cases the fits became worse during pregnancy; in 3 they were unaffected. Of the 13 non-toxemic cases 5 became worse, one improved and 7 were unaffected.

Premature interruption of pregnancy did not occur in this series. Fits did not occur during labor, and none began during the puerperium. In this series of cases no relationship between the incidence of fits and sex of the fetus could be discerned.

In 14 cases breast feeding was permitted (nursing is permitted by the author if a third capable person can always be present at feeding time). In none of the mothers was epilepsy aggravated by lactation. Epilepsy beginning during lactation (within 2 months after delivery) was not observed.

The writer postulates factors influencing the behavior of fits during pregnancy. The channels through which the adverse strain of pregnancy may affect the susceptible individual are water retention, CO<sub>2</sub> deficiency, hypocalcemia and possibly altered hormonal relationships. When an epileptic becomes pregnant,

the course of her pregnancy, and the number of fits will result from the summation of related and antagonistic factors exercised on the nervous system of a susceptible and dysrhythmic individual.

It has been suggested that eclampsia is an acute form of epilepsy and Poter considered them identical diseases. The 3 phenomena which call for correlation are: (1) the occasional inauguration of epilepsy by an attack of eclampsia; (2) a predisposition to fits in relatives of eclamptics; and (3) the unequal tendency to fits in pre-eclamptics of equal severity. The correlating factor appears to be the existence, in varying degrees in different patients, of the basic nervous instability which is revealed in electroencephalographic tracings as cerebral dysrhythmia. In eclampsia the cerebral vaso-constriction with or without edema, culminating in cerebral anemia, serves to fire off a convulsion, while in epilepsy the exciting mechanism is associated with cerebral edema, hypocalcemia, CO<sub>2</sub> deficiency or alkalosis.

A case of status epilepticus occurring during pregnancy is presented, and termination of pregnancy, which was successful in this case, is advocated as the treatment of choice. The treatment for status epilepticus during pregnancy would appear to be:

1. Surgical induction of labor by a non-shocking technique, such as separation and low rupture of the membranes.
2. Control of fits by sedatives and judicious use of lumbar puncture until delivery is accomplished and the fits have lessened or ceased.
3. Maintenance of cardiac strength by glucose fluids, oxygen, cardiac stimulants and skilled nursing.
4. Ready recourse to sulfonamides and penicillin to eliminate septic processes, which are very liable to follow a period of coma and multiple fits.

The modern outlook on sterilization and the transmission of epilepsy are reviewed. It is concluded that, for the present, unless there are special indications, sterilization must be restricted to those cases which have been rescued from status epilepticus. It appears that the inheritance of epilepsy is an infrequent occurrence.

## A CONTRIBUTION TO THE STUDY OF ECLAMPSIA

### CONSIDERATION OF 200 CASES

FRANK E. WHITACRE, M.D., WALTER M. LOEB, JR., M.D.,  
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With the assistance of T. S. HILL, M.D., and HUDSON JOST, PH.D. on the  
electroencephalographic tracings

J. A. M. A., 133: 445-449, 1947

The present report comprises data on 100 consecutive eclamptic patients from the obstetric and gynecologic service of the Peiping Union Medical College

Hospital, Peiping, China, observed during the years 1935 to 1941. These cases are compared with those of 100 consecutive eclamptic patients from the department of obstetrics and gynecology of the University of Tennessee at Memphis, observed during the years 1941 to 1945. Henceforth the group from Peiping will be designated group 1 and that from Memphis group 2. The 100 cases of women with convulsive seizures in group 1 occurred among 4553 deliveries, giving a hospital incidence of 2.2 per cent, while in group 2 the same number of convulsive patients were encountered in 8797 deliveries, giving a hospital incidence of 1.2 per cent. The highest seasonal incidence in both groups was in the summer and autumn, and the age incidence was practically the same. Inasmuch as each group consists of 100, each patient represents 1 per cent. All the patients from Peiping were Chinese, while in the Memphis series 96 were Negro and 4 white. The assertion by numerous authors that eclampsia is a disease of primiparas is borne out by our cases; in the Chinese series 75 were primiparas and 25 multiparas, while in the Memphis group 72 were primiparas and 28 multiparas. In group 1 there were 73 who had not previously been seen in the outpatient clinic, while in Memphis 55 were admitted to the hospital without previous treatment, which emphasizes the value of prenatal care.

In regard to the appearance of convulsions in relation to the labor, 75 of group 1 were antepartum, 10 intrapartum and 15 postpartum, while 77 of group 2 were antepartum, 6 intrapartum and 17 postpartum. The stage of gestation conformed to the reports of others, as 98 cases in group 1 and 99 in group 2 occurred after the sixth month of pregnancy.

The uncorrected mortality rate shows maternal death in 20 and fetal death in 36 cases of group 1, while in group 2 maternal death occurred in 14 and fetal death in 20 instances (table 2). In group 1, 53 patients were treated by means of morphine and chloral hydrate. There were 4 cesarean sections; 2 of these patients died. The total of deaths among the 53 mothers was 14.

Study of the data contained in this report brought out several factors. Race did not seem to be significant. There was no appreciable difference in the two groups in regard to the ages and parity of the patients concerned. The stage of gestation was almost identical. The blood chemical findings are very similar, and the lower blood pressures in group 1 are in accord with the low blood pressures which are in general found among the Chinese. The high incidence of eclampsia among the Chinese is significant, and the incidence in the group in the Midsouth, in the authors' opinion, is unusually high. This high incidence will be reduced only when the public is better informed on the benefits of prenatal care, which includes advice in regard to a properly balanced diet during pregnancy. The deficient diets of both groups reported are similar. The Chinese poor eat rice, millet and koa-liang, a kind of corn. The poor of the Midsouth eat cornbread, salt fat pork and various types of beans. It is clear that the first class proteins, vitamins and, to some extent, essential minerals are deficient in the diets of the two groups.

In considering eclampsia one of the first questions is "Where do we see eclamptic patients?" Regardless of the geographic location it is clear that for the most

part they are seen on the charity services of hospitals. This was apparent from the senior author's observations in the Philippines (1942-1943) where, at the Philippine General Hospital, he saw a large number of eclamptic patients; they too were among the indigent group.

(Although this article touches upon many aspects of eclampsia, its main tenet, as I understand, is that eclampsia increases in proportion to indigency whether in China or in Tennessee. The Peiping Union Medical College where Whitacre worked, is the referral center for a large proportion of the obstetric pathology of a huge metropolis and hence the material there is heavily weighted by abnormal cases and no valid conclusions can be drawn about the incidence of eclampsia among the Chinese from figures at that clinic. However, anyone who has worked in obstetrics very long in China cannot escape the impression that Chinese women do suffer eclampsia and pre-eclampsia rather more frequently than American gravidæ and, moreover, are especially likely to develop other signs of water imbalance such as edema of the vulva. When it is also noted that edema in nonpregnant persons of undeniable nutritional etiology is frequently seen there, the conclusion is unavoidable that nutritional deficiencies may play an important role in the frequency of edema in pregnant women in that country.

It would be my reaction that the main dietary infractions which may be linked up with eclampsia in the Chinese are inadequate animal protein and excessive sodium chloride. Among Chinese in the lower economic groups animal protein is almost entirely lacking in their diet, their source of protein being chiefly soy bean and other grains; at the same time their foods are very highly seasoned with salt. Since these same criticisms can be applied to the diet of American negroes of the indigent group, Whitacre's emphasis on the frequency of eclampsia in women of these categories gives additional weight to the belief that dietary errors probably play an important role in the etiology of the toxemias.

However, one lesson which can be drawn from obstetrical experience in China seems clear and indisputable, namely, that low calcium is not a cause of eclampsia since osteomalacia patients in China, even though they may be in an acute stage of the disease with serum calcium down to 5 mg. per 100 cc., do not have eclampsia any more frequently than other Chinese women.—Ed.)

## SENSITIZATION OF THE VASCULAR SYSTEM IN PRE-ECLAMPTIC TOXAEMIA AND ECLAMPSIA

F. J. BROWNE

J. Obst. & Gynaec. Brit. Emp., 53: 510-518, 1946

Evidence is cited that the cause of the hypertension in pre-eclamptic toxemia is an abnormally increased sensitivity of the vascular system to pressor hormones rather than the existence of an excess of the pressor hormone itself. While the results of different workers differ in certain details, all agree that in pre-eclamptic toxemia there is, as compared with normal pregnancy at or near term, a very severe reaction indicated by a large rise of systolic pressure following the injection of a standard amount of the pressor substance. This difference in reaction must be due to a difference in sensitivity of the vascular system.

In the present investigation the reactions to pressor substances were tested

in a series of 27 normal women in the early weeks of pregnancy. The substance injected was tonephin (0.66 cc.). It was expected that some of these women would develop pre-eclamptic toxemia, and the reaction of these to tonephin could then again be tested. Three women actually reached the adopted standard for pre-eclamptic toxemia (blood pressure of 140/90 or over, with or without edema and albuminuria). Two of these cases showed that the abnormal sensitivity of the vascular system is not inherent or constitutional, but that it is acquired, and that this develops between the early weeks of pregnancy (? seven-teenth week) and the time of appearance of the pre-eclamptic toxemia.

The author's experiments and the results of clinical experiments of other workers suggest that the sensitizing substance is chorionic gonadotropin rather than estrogenic hormone or hormone of the adrenal cortex. Smith and Smith claim that gonadotropic hormone is increased for from 5 to 6 weeks before the appearance of toxemia. By the administration of estrogenic substances, they claim to be able to diminish the quantity of gonadotropic hormone and thus prevent toxemia.

## HYPERTENSION AND CALCIUM INTAKE

C. M. KESSON AND A. McCUTCHEON

*Lancet*, 2: 793, 1946

During an investigation of the etiology and treatment of senile osteoporosis, the authors have made observations which throw some light on the relationship between lime intake and hypertension.

Eighty patients over the age of 40 years were examined, 32 of which gave definite radiographic evidence of osteoporosis. All were ward patients whose intake of calcium for years had no doubt been less than the amount usually considered the minimal daily intake (0.5 g.). One would expect that hypertension and arteriosclerosis would be rather less prevalent in the osteoporotic group than in the non-osteoporotic group, if retention of calcium is an important etiological factor in hypertension. The average blood pressure in the osteoporotic group was 164/96, and in the non-osteoporotic patients, 167/96 mm. Hg. There was found no special association between osteoporosis and hypertension, physical phenomena of arteriosclerosis, or calcification of the vessels as demonstrated by radiography.

In the course of investigation 19 patients received supplementary calcium so that each patient took not less than 1.6 g. of calcium daily, for periods ranging from 6 to 15 months. In 9 patients calcium retention was determined for 2 weeks at the start of the investigation, and the average amount retained was 1.051 g. daily (limits 0.556 and 1.358 g.). In 2 cases repeat estimations were made 14 and 18 weeks later, respectively, and calcium retention remained high as in the first month of the calcium diet. If a high retention of calcium is an

important etiological factor in the production of hypertension, one might expect to find evidence of hypertension in these patients. However, in no instance was there any significant change in the systolic or diastolic pressures. In only one patient was there radiological evidence of increased calcium deposition, and this was not more than might be expected in a patient at her age (66 years), irrespective of diet.

## WEATHER CHANGES AND ECLAMPSIA

N. SAPEIKA

J. Obst. & Gynaec. Brit. Emp., 53: 461-465, 1946

The incidence of eclampsia varies greatly in different parts of the world, and it is generally believed that there is a seasonal incidence for the disease. Many obstetricians consider that weather change is one factor of possible importance. According to Dieckmann, sudden meteorological changes may cause eclampsia in susceptible individuals. Arnell found that the time of onset of seizures of antepartum eclampsia coincided in 83 per cent of cases with a rising barometric pressure, a decreasing environmental temperature and a high degree of humidity. However, a study of the literature reveals much contradiction in the meteorological factors considered to predispose to eclampsia.

The writer presents a series of 63 cases of antepartum eclampsia in Cape Town and 20 cases in Johannesburg in which the time of onset of the first convulsion was known, and was studied in relation to the meteorological events for the day of onset and the preceding 4 or 5 days. It is concluded from this study that season in itself does not appear to be associated with eclampsia. No correlation could be found between the time of onset of antepartum eclampsia and the meteorological factors studied. Statistical analysis of the values for these factors failed to give significant results. The contradictory statements of different authors further supports the view that some other factor must be sought to explain the onset and incidence of eclampsia. 2 figures.

## THE EFFECTS OF THE INGESTION OF LARGE AMOUNTS OF SODIUM CHLORIDE ON THE ARTERIAL AND VENOUS PRESSURES OF NORMAL SUBJECTS

HAROLD GRANT, M.D., AND FRANCIS REISCHSMAN, M.D.

*Dallas, Texas*

Am. Heart J., 32: 704-712, 1946

In this study the effects of the ingestion of an excess amount of sodium chloride in normal adults was observed. The subjects used were 8 healthy medical

students and physicians ranging in age from 18 to 31 years. They were permitted to continue their normal activities throughout the course of the experiment. After a control period of two to four days, the administration of 20 to 30 Gm. of sodium chloride per day, taken in the form of 1.0 Gm. enteric-coated tablets divided into four or five approximately equal doses, was started. No attempt was made to regulate the salt intake in the diet and fluids were allowed *ad libitum*.

All subjects were weighed every day at the same time in the post-adsorptive state. Venous pressure was determined by the direct method after a rest period of approximately thirty minutes. At the same time, pulse rate and arterial blood pressure were recorded. In five of the subjects additional studies of the changes in body fluids were made. The daily fluid intake and urine output were measured. Blood volume determinations were carried out by the dye method, using T-1824. The ampoules containing an accurately measured amount of dye, as devised by Gregersen, were used. A period of ten minutes was allowed for mixing, and five samples were taken at ten-minute intervals in heparin-wet syringes. Simultaneously, changes in the volume of extracellular fluid were estimated by measuring the "thiocyanate space" according to the method of Crandall and Anderson, employing the following formula:

$$\text{"Available fluid"} = \frac{\text{CNS injected (mg.)} \times 100}{\text{CNS in blood (mg.\%)}}$$

Fifty minutes were allowed for mixing and all measurements were done in duplicate. The plasma chlorides were calculated by the titration method. Determinations of the hematocrit and of the total serum proteins were made.

All of the subjects showed a gain in weight which varied from 0.25 to 2.20 kilograms. Changes in the venous pressure from +21 to +126 mm. of water were observed. Changes in the plasma volume were from +70 to +700 cc.; in the blood volume from -320 to +900 cc.; and in the "thiocyanate space," from +1070 to +3260 cubic centimeters. There were no significant alterations in the arterial blood pressure.

The authors note that a very similar experiment to that reported here was carried out by Lyons, Jacobson, and Avery. In seven subjects, after taking 40 Gm. of sodium chloride in forty-eight hours, the average weight gain was 1.9 kg. and the average rise in venous pressure, 31 millimeters. These results are quite similar to those observed in this experiment where the average weight gain was 1.04 kg. and the average rise in venous pressure, 59 millimeters. The amount of salt was greater and the duration of observation longer in this present study.

It is suggested that the edema in those patients with acute glomerulo-nephritis who do not exhibit pulmonary congestion, gallop rhythm, nor prolonged circulation time is caused by the retention of salt and water by the diseased kidneys. This also leads to an abnormally high degree of hydration in which there is increased blood volume, venous pressure, and volume of extracellular fluid.

ENDOCRINE INFLUENCES UPON THE BLOOD PRESSURE OF  
NORMAL AND HYPERTENSIVE RATS

E. W. PAGE AND E. OGDEN

Am. J. Obst. &amp; Gynec., 53: 150-154, 1947

This report is concerned with the possibility that the fall of blood pressure in hypertensive rats during pregnancy is due to an altered endocrine state. The results obtained from these experiments do not justify the assumption that endocrine influences alone are responsible for the observed decline in blood pressure during late pregnancy in animals with experimental hypertension.

It was found that in both normal and hypertensive rats the blood pressure is unaffected by the estrus cycles.

The writers have observed the blood pressure in normal female rats from conception to weaning of their litters. In every rat there was a slight but significant decline during the last quarter of pregnancy. During lactation there was a progressive rise of similar magnitude, and after weaning the pressure returned to a lower level. These changes, though relatively slight, are qualitatively similar to the more marked fall which occurs in the hypertensive rat during pregnancy. The pseudo-pregnant state did not result in a decline of hypertension.

Estrone and progesterone (singly and in combination), anhydro-hydroxy-progesterone, pregnant mare serum, and chorionic and lactogenic hormones were administered in relatively large doses over a period of 10 to 16 days, and did not differ in their effects on hypertensive rats from injections of normal saline or olive oil.

## OEDEMA OF VULVA DUE TO TOXAEMIA OF PREGNANCY

J. P. BUSH

Brit. M. J., 2: 988, 1946

A 21 year old primigravida, whose expected date of confinement was March 26, 1946, had an uneventful pregnancy until February 15, when she complained of some swelling of her ankles. At the thirty-sixth week of pregnancy, a fortnight later, her blood pressure was 150/95. At the thirty-eight week the blood pressure was 150/105 and there were albuminuria and gross pitting edema of legs and thighs.

On admission (March 14) there was also considerable pitting edema of the vulva. The blood pressure was 150/110; albuminuria—5 parts per 1000. In spite of fluid restriction, salt-free low-protein diet and vitamin B<sub>1</sub> therapy, the



edema did not decrease. The edema of the vulva increased but that of the legs decreased. By March 16 no improvement in her condition having occurred, cesarean section was performed. The indications were a severe pre-eclamptic toxemia which did not respond to treatment and gross edema of the vulva sufficient to obstruct any attempt at normal delivery. The classical upper-segment operation was performed since bladder catheterization was impossible owing to the edema. More than a pint of yellow fluid was removed from the peritoneal cavity. A normal male child (6 lb., 1 oz.) was delivered in good condition. The mother's condition was good.

Her subsequent progress was satisfactory. She developed a temperature on the third day, for which no symptoms were apparent, and the edema prevented obtaining a catheter specimen of urine or cervical swab. The pyrexia responded to sulfadiazine therapy. The edema subsided, blood pressure returned to normal and albuminuria disappeared. At discharge on April 8 and at the post-natal clinic on May 1 the patient was in good health and the child progressing satisfactorily. 1 figure.

(Fulminating pre-eclampsia in the presence of a cervix unsuitable for induction is a very good reason for cesarean section, but edema of the vulva per se would probably be regarded as a questionable indication by anyone who has delivered many such patients vaginally. Although the edema may be massive, it is surprising how the vulvar tumors ride up out of the way as the perineum distends; and in my own experience this condition has never per se called for abdominal delivery.

Speaking of edema of the vulva, one of my colleagues has had two extreme examples of it in his practice recently,—both associated with twin pregnancies. We all know of course that multiple pregnancies are especially likely to be associated with edema in other parts, and in a case of massive edema of the vulva, the possibility of twins should always be thought of.—Ed.)

## ECTOPIC PREGNANCY

F. M. INGERSOLL AND T. B. MALLORY

New England J. Med., 235: 881-882, 1946

A 27 year old tripara was admitted complaining of severe, continuous lower abdominal pain which had developed within 3 hours of admission. The most recent menstrual period had begun 6 days previously and was nearly at an end. The patient had had intercourse before the onset of the period. There had been no intermenstrual bleeding or discharge. Five years previously the patient had had a ruptured ectopic pregnancy.

The abdomen was soft with tenderness above the pubis; there were no masses. There was a feeling of fullness in the right vault. Motion of the cervix caused severe pain. The temperature was 100 degrees F.; blood pressure 100/60; red cell count 4,200,000; hemoglobin 10.0 gm.; white cell count 11,500; urine normal. The patient was put to bed, after which the pain improved and completely sub-

sided. About 2 hours later the pain began again, accompanied by slight spasm in the right lower quadrant. Pelvic examination revealed a mass to the right of the uterus. Operation was performed.

Dr. Ingersoll believes that the most probable diagnosis is an ectopic pregnancy. This is suggested first by the history of a previous ectopic pregnancy. Also, the sudden onset of symptoms favors this diagnosis. In this case the patient had first an indefinite and later a definite mass, probably due to further hemorrhage following rupture. Exquisite tenderness on motion of the cervix is also characteristic of ectopic pregnancy. Dr. Ingersoll does not believe that the patient had bled enough to lower the red cell count markedly. The white cell count is consistent with ectopic pregnancy. Other conditions which come to mind are pelvic inflammation due to gonorrhea, torsion of a normal fallopian tube, and twisted ovarian cyst. The acute onset of pain, lack of spasm and the fact that no gonococci were found in the vagina make it unlikely that the patient had pelvic inflammation. The fact that no discrete mass was felt at the first examination is against the possibility of twisted ovarian cyst.

At operation a hemorrhagic mass was found at the fimbriated end of the right fallopian tube. Histologic examination showed numerous chorionic villi distributed in decidual tissue. The anatomical diagnosis was ectopic pregnancy.

## REPEATED ECTOPIC PREGNANCY

H. BRYAN AND T. J. MONTEMURO

Canad. M. A. J., 55: 601-602, 1946

The case is presented of a 29 year old woman, para iii, who was admitted to the hospital complaining of an ache in the lower abdomen. The last menstrual period had been missed, but there had been spotting for one day. The temperature was 98 degrees; pulse 72; respirations 22; blood pressure 114/70; white blood cells 8800; Hb. 70 per cent. There was abdominal tenderness and rigidity, most marked in the right lower quadrant. A boggiess could be felt in the pouch of Douglas and movement of the cervix caused pain. At operation an ectopic pregnancy of the right Fallopian tube was excised with the right ovary.

Five and one-half months later the patient was readmitted with signs and symptoms more marked than on the previous occasion. She had been seized with severe pain in the lower abdomen 2 days previously and, on admission, complained of pain in the epigastrium. There had been spotting for 2 days. The temperature was 101 degrees; pulse 120; respirations 20; blood pressure 120/80; white blood cells 12,500; Hb. 55 per cent; sedimentation rate 16 mm. There was abdominal distention, tenderness and some rigidity. There was slight bleeding from the cervix and pain on movement of the cervix. At operation an ectopic pregnancy of the left Fallopian tube was removed. The peritoneal cavity contained about 500 cc. of blood and clots. The specimens from

operation at each ectopic gestation showed chronic salpingitis on pathologic examination.

Schumann finds an apparent tendency for recurrence of tubal pregnancy in women who have had one tube removed for this condition, the etiology probably being the same in both instances. In 1901 Pestalozza collected 111 cases of repeated ectopic gestation: In several instances only a few months have separated the 2 pregnancies.

Sampson and Smith believe that recurrence occurs so frequently that one is justified in removing the uterus and nonpregnant tube at the first operation. The author believes that both tubes should be inspected for an ectopic ovum at the first operation, and if the remaining tube shows evidence of inflammation and is hopelessly damaged, it may be removed. Otherwise it should be permitted to remain, for 47 per cent of women who have had one extra-uterine pregnancy subsequently give birth to normal intra-uterine children.

### THE VALUE OF LAPAROSCOPY AS A DIAGNOSTIC AID IN EXTRA-UTERINE PREGNANCY

S. SALA, E. SIMONETTI AND R. POMARES

Bol. Soc. Obst. y Ginec. de Buenos Aires, 25: 162-167, 1946

The authors present a case of ruptured tubal pregnancy which could not be diagnosed by physical examination, repeated Friedman tests and colpotomy. All of these were negative. A correct diagnosis was, on the other hand, established with the aid of a laparoscope, and later confirmed by laparotomy.

This procedure should not be used routinely in gynecology. It should be resorted to only in those cases where a diagnosis cannot be established with certainty, or when a laparotomy seems to be the last semiologic procedure to appeal to.

(Laparoscopy or peritoneoscopy, performed through the abdominal wall, and culdoscopy, through the posterior fornix with the patient in the knee-chest position, have been employed in a number of clinics, and, while the indications are relatively infrequent, and the method should be restricted to those cases in which simpler diagnostic procedures are not decisive, there is no doubt that in such cases valuable information can sometimes be gained. An excellent discussion of culdoscopy may be found in a very recent paper by Decker (*Am. J. Surg.*, 73: 313 (March) 1947.—Ed.)

### FOETAL BONES IN URINARY BLADDER; UNUSUAL TERMINATION TO ECTOPIC PREGNANCY

H. W. FORSHAW

*Lancet*, 2: 716, 1946

A 38 year old woman came to the author's outpatient clinic at the African Hospital in Nigeria complaining that she had passed small bones in the urine.

It is difficult to obtain an accurate history from a patient from the African bush and, furthermore, diagnostic facilities are limited, cystoscopy and radiography not being available at an African bush hospital. On several occasions between November, 1942, and April, 1943, the patient had passed small bones in her urine. There had been no hematuria, and dysuria only when bones were passed. She had had dyspareunia for the last 2 years, and had had intermittent amenorrhea during 1942. She stated that 9 years ago she had become pregnant and, at full term, was seized with severe abdominal pain and a show of blood per vaginam. The pain stopped in half a day and the bleeding stopped in one day. The abdominal swelling gradually subsided in 3 months.

Vaginal examination revealed a tender, hard irregular swelling in the anterior vaginal wall. A metal catheter, inserted into the bladder, revealed a hard mass. A tentative diagnosis of an old ruptured ectopic pregnancy which had ulcerated into the bladder was made. Through a suprapubic incision dense adhesions were found between the uterus, left broad ligament and bladder. The hard mass appeared to be entirely in the bladder. The latter was opened and numerous bones, many of which could be identified as fetal bones, were recovered. The patient recovered uneventfully.

## CHRONIC PORPHYRIA COMPLICATED BY PREGNANCY

S. LINAS, M. L. SOLOMON AND F. H. J. FIGGE

J. A. M. A., 133: 105-107, 1947

A case of chronic porphyria complicated by pregnancy in a woman aged 20 years is presented in this paper. The patient was a primigravida whose estimated date of confinement was January 27, 1946. Obstetrically the pregnancy progressed normally, but in July, 1945 she began to show a decided exacerbation and extension of her cutaneous lesions. The daily excretion of porphyrin prior to pregnancy, with therapy, had been 800 to 1000 micrograms. It increased during pregnancy to 1200 micrograms of porphyrin daily in August, 1945. At this time the therapeutic regimen was: calcium lactate 40 grains and sodium bicarbonate 80 grains by mouth daily. She also received riboflavin 20 mg. every 4 hours, ascorbic acid 1000 mg. every 4 hours and nicotinamide 100 mg. orally twice daily. She was given one ampule of Solu B intramuscularly twice weekly and penicillin ointment was used for the skin lesions. On this regimen the patient felt better, but new lesions continued to appear throughout the remainder of pregnancy.

The pregnancy progressed entirely uneventfully except for a slightly excessive gain in weight, a total of 36 pounds. At the end of pregnancy the patient was still excreting 1200 micrograms of porphyrin daily. Spontaneous labor occurred on January 30, 1946, and a live male child was delivered by low forceps. The placenta separated spontaneously and showed fairly extensive diffuse fibrosis.

The placenta contained many calcareous deposits which were brilliantly red fluorescent under ultraviolet light.

The puerperium was entirely afebrile. The only medication the patient received subsequent to delivery was ergonovine maleate and ferrous sulfate. Within 48 hours after delivery the skin lesions showed much improvement. The baby was not allowed to breast feed in order to eliminate this source of porphyrin. The urine of the baby showed enough porphyrin to be evident spectroscopically and to form a red fluorescent precipitate. This disappeared by the third day.

Since discharge from the hospital the patient has continued to show subjective and objective improvement. At 7 months post partum she has not shown exacerbations of the porphyria. The baby has developed normally and shows no evidence of porphyria. At present the patient is excreting about 400 micrograms of urinary porphyrin daily (approximately 4 times the normal amount).

The authors conclude that the spectacular improvement which started immediately post partum and which has continued for several months makes it appear that the total experience of her pregnancy has had a beneficial effect on this patient. This, and the fact that the child appears perfectly normal, would lead one to the conclusion that chronic porphyria is not an indication for interruption of pregnancy. 1 figure.

## PLACENTAL ALTERATIONS IN THE ABORTION INDUCED BY ESTROGENS IN RABBITS

R. SAMMARTINO AND O. BLANCHARD

*Obstetricia y Ginecologia Latino-Americanas*, 4: 533-549, 1946

The authors studied the placental changes taking place in rabbits following administration of estrogens by injections. Death and expulsion of the fetus occur during the second half of pregnancy, on the 5th, 6th, and 7th, day following a single injection of 0,025-0,075 mgr. of dipropionate of dioxydiethylstilbene.

In order to analyse the placental changes that take place, they injected 0,0125 mgr. of dipropionate of dioxydiethylstilbene and, in a third group of 8 rabbits, a single dose of 0,25 mgr. of estradiol benzoate. The animals were sacrificed 8, 16, 24, 40, 62, 72, 81 and 144 hours later. In these 2 series of experiments, the uterine enlargements became smaller while the duration of estrogenic activity increased. After 18 hs. the expanding and infiltrating tendency of the ectoderm may become inhibited (anemia due to vascular constriction) and a process of nuclear regression may occur as well. After 24 hs. the changes are even more pronounced; after 40 hs. large maternal lakes appear in the placenta, whereas coagulation and hemolysis take place in all vascular spaces. After 60 hs. the

level of ovular detachment is marked by autolysis; the necrobiotic process taking place in the placental elements become more and more marked.

It seems therefore, that when estrogens are administered to rabbits, the abortion is caused mainly by the altered maternal circulation, which seems to exert a pathological effect directly upon the fetal ectoderm. No important changes occurring in the corpora lutea were noticed.

## MYASTHENIA GRAVIS AND PREGNANCY (A CASE REPORT)

G. S. ADAM

J. Obst. & Gynaec. Brit. Emp., 53: 557-561, 1946

It appears that obstetrical opinion is changing in regard to the management of cases of myasthenia gravis as a complication of pregnancy. While it is agreed that therapeutic abortion no longer has any place in the control of this condition in pregnancy, there is less uniformity on the question of whether the patient should be permitted to deliver by natural channels.

A case record is presented which offers evidence in support of Wilson and Barr's observation that such patients, delivered normally, are likely to have rapid and uncomplicated labors. The subject of the present case had not been treated previously, and had a severe form of myasthenia gravis. Except for an aggravation of symptoms at the onset and mild transient relapses of a periodic nature, the pregnancy was uneventful. In spite of the labor being complicated by a posterior position of the occiput, there were during this stage no untoward developments which might have been attributed to the myasthenia gravis. There was no evidence of undue fatigue of the voluntary musculature. Although no serious relapse occurred during the puerperium, reduction in the daily dose of prostigmin and ephedrine could not be effected without a return of symptoms.

## ACUTE LEUCEMIA AND PREGNANCY; REPORT OF FATAL CASE TREATED WITH PENICILLIN

R. HARRIS, I. G. TCHERTKOFF AND L. GREENWALD

Am. J. Obst. & Gynec., 53: 142-149, 1947

A fatal case of acute myelogenous leukemia and pregnancy treated with penicillin is reported, and the authors discuss the present status of the management of this complication.

The patient, aged 34 years, was first seen when 5 months pregnant, with a marked sore throat and difficulty in swallowing. Two weeks before admission

symptoms of headache, malaise, weakness and fever had begun. Prior to the onset of this illness the patient had been in excellent health; she had had an uncomplicated pregnancy 10 years previously. Her temperature on admission was 101 degrees F.; pulse 100; blood pressure 115/60. The pharynx was swollen, edematous, painful and ulcerated. The gums were congested, tonsils enlarged and mucus covered, and both eyes were suffused.

Peripheral blood study revealed the presence of myeloblasts and promyelocytes, and a bone marrow smear showed marked cellularity as well as myeloblasts and promyelocytes. It was believed that the patient suffered from an acute myelogenous leukemia presenting throat lesions and aggravated by secondary infection. Penicillin, 10,000 units intra-muscularly every 3 hours after 2 initial doses of 20,000 and 15,000 units, was given. The clinical condition of the patient improved rapidly and her temperature dropped to normal; however, her blood picture continued to show the presence of a high percentage of myeloblasts and other early forms.

Seven days after admission the patient aborted. An autopsy on the stillborn fetus revealed no sign of leukemia. This confirms the general impression that leukemia is not found at birth in children born of leukemic mothers.

The patient was discharged about one month later, afebrile and in fairly good condition with her leukemic blood picture essentially unchanged. She was readmitted in about 3 weeks, with elevated temperature, diarrhea, urinary frequency and back pain. Penicillin brought no dramatic response, the temperature returning to normal only after 4 weeks. In about a month her clinical condition permitted discharge from the hospital. She returned 11 days later, after which her illness became progressively worse until she expired, approximately 20 weeks after her initial hospital admission.

It was felt that the leukemia had begun during this patient's second pregnancy. Absence of noticeable lymphadenopathy, absence of palpable liver and spleen, the blood and bone marrow findings, marked prostration and throat lesions all indicate an acute leukemic process. This case demonstrates the importance of doing complete blood counts early in pregnancy. Penicillin appeared to be of some value in combating super-imposed infection, but did not materially improve the leukemic blood picture in this case.

The treatment of leukemia complicated by pregnancy is still unsatisfactory. Some believe the pregnancy should be interrupted because the treatment necessary to control the leukemia may injure the fetus. Premature induction of labor or cesarean section is justifiable only when the pregnancy is near term. Conservative therapy was used in the present case but, as usually occurs, the patient aborted spontaneously.

At present, the best therapeutic agents for the leukemia itself are radiation and arsenic. In acute leukemia no known form of treatment is of lasting value. Blood transfusions may prolong life for a short time. The writers recommend that penicillin be tried in leukemic patients showing signs of infection and sepsis. 3 figures.

DIABETES INSIPIDUS IN ASSOCIATION WITH POSTPARTUM  
PITUITARY NECROSIS (A REPORT OF TWO CASES)

A. W. SPAIN AND F. GEOGHEGAN

J. Obst. &amp; Gynaec. Brit. Emp., 53: 223-227, 1946

It is now established that postpartum ischemic necrosis of the anterior pituitary is a relatively frequent complication in cases where delivery is attended by a severe degree of collapse. In a careful follow-up of 128 cases in which collapse (mostly associated with hemorrhage) had occurred at delivery, Sheehan was able to demonstrate that in 41 cases which survived there subsequently appeared symptoms which suggested strongly some degree of anterior lobe pituitary necrosis. In a reverse follow-up of 15 cases of parous women exhibiting clinical evidence of hypopituitarism he found that in 13 of these cases severe hemorrhage had complicated the preceding delivery. Two cases are presented in the present paper which are of interest in that the occurrence of symptoms of diabetes insipidus in association with postpartum necrosis of the pituitary has not previously been commented on.

The first patient, aged 22 years, had acute spontaneous inversion of the uterus following spontaneous delivery, and passed into profound shock. The inversion was at first partial and a vaginal examination was not made until some 45 minutes after the patient first passed into shock. With complete inversion she again passed into profound shock, and the inversion was reduced. After this, her condition improved and she appeared to be out of danger. However, from the sixth day of the puerperium until her death on the tenth day she showed *inter alia*, clinical evidence of diabetes insipidus. Her urine output in these 4 days was 916 fluid ounces (229 ounces per day). In the light of the postmortem findings, the clinical features of interest are the profound and prolonged shock without hemorrhage, and polyuria and polydipsia. Sections of the pituitary showed massive necrosis of the anterior lobe. Only occasional groups of healthy cells remained about the periphery of the gland. The posterior lobe showed partial degenerative change with loss of the normal compact structure of the neuroglia and a notable deficiency of pituicytes in the degenerate area. Attention is directed to this latter lesion in view of the polyuria which was a striking clinical feature in this case.

The second patient, aged 34 years, was admitted in some shock with intense headache. She had been found unconscious in a field, and shortly thereafter had had an eclamptic fit. She was about 36 weeks pregnant. On admission there was slight vaginal bleeding, marked edema, and albumin was present in the urine in large amount. The blood pressure was 130/80. The uterus was active; the cervix was dilated to 3 fingers. About 2 hours after admission the patient was delivered by low forceps of a stillborn child. The third stage of labor lasted 5 minutes and the placenta was followed by a large clot. The patient died 84



hours after delivery; acute pulmonary edema developed 12 hours before death. In the 72 hours before she became unconscious she passed 593 ounces of urine (190 ounces per day) and complained of thirst and headache. At autopsy, sections from the pituitary showed an almost complete necrosis of the anterior lobe, with a few small islets of surviving cells. In the posterior lobe there was an area in which degeneration of the neuroglia and deficiency of pituicytes was observed. 4 figures.

## THE POSITIVE DIAGNOSIS OF HYDATIDIFORM MOLE WITHOUT EVIDENCE OF MOLE CYSTS

H. ACOSTA-SISON

Am. J. Obst. & Gynec., 53: 132-134, 1947

The author presents a method of diagnosing positively hydatidiform mole which consists of (1) fullness of part or the whole lower uterine segment in conjunction with (2) undue uterine enlargement as related to the number of months of amenorrhea, (3) uterine bleeding, (4) absence of fetus as revealed by palpation auscultation and of fetal movements, and (5) absence of amniotic fluid. Moreover, in mole, where the uterus is the size of a 5 months' pregnancy, the uterine sound, when introduced into the uterine cavity, reaches far beyond the lower segment. In a normal 5 months' pregnancy the sound becomes arrested by the membranes beyond the cervix. The procedure should be performed with utmost gentleness under the greatest aseptic precautions in the operating room where dilatation and curettage may be performed immediately, if necessary. The writer seldom finds it necessary to resort to this latter procedure, as the previously outlined signs constitute the positive diagnosis of hydatidiform mole.

Five case reports are presented which are explanatory of the method.

## PATHOLOGY OF LABOR AND PUERPERIUM

### LATE POSTPARTUM HEMORRHAGE

S. A. WOLFE AND P. PEDOWITZ

Am. J. Obst. & Gynec., 53: 84-99, 1947

In this paper, late postpartum hemorrhage indicates prolonged or excessive uterine bleeding beginning after the first day following delivery. The writers deal with late postpartum hemorrhage due to: (1) retained placental fragments; (2) uterine abnormalities in involution of the placental site; (3) uterine abnormalities in retention and separation of the decidua vera.

Retention of placental fragments is the most frequent cause of late postpartum hemorrhage. At the Brooklyn Jewish Hospital there were 32 such cases after 32,155 deliveries, an incidence of 1 to 1005 cases. Five additional cases confined in other hospitals are added, making a total of 37 cases in this group encountered between Jan. 1, 1934, and Sept. 1, 1944. Spontaneous expulsion may occur (4 cases), but more commonly operative removal followed one or more episodes of bleeding (31 cases). Enmeshment or polyp formation occurred in 2 cases.

The clinical findings in cases of retained placental fragments requiring surgical intervention were not sufficient for diagnosis. Digital exploration of the uterus is the only sure method of diagnosis. Most commonly, abnormal vaginal bleeding appeared between the sixth and tenth postpartum days. Shock (systolic blood pressure below 100, pulse above 100, pallor, cold skin) in varying degrees was present in 14 of 24 afebrile cases. All uteri were noted as subinvolved. Since a patulous cervix is a normal finding up to the twelfth postpartum day, the value of a patent cervix as a diagnostic aid applies only to later cases. Seven patients were febrile, and the symptomatology was essentially the same as in the afebrile group. However, the onset of bleeding occurred somewhat later in the febrile group; in only 2 of the 7 cases did the initial bleeding episode occur before the tenth day. Five of the 7 cases exhibited mild to severe shock. The finding of a patulous cervix in infected cases is of some diagnostic import, since bleeding more frequently occurs after the twelfth day.

The clinical manifestations of placental polyp and the physical findings are essentially similar to those of retained placental fragments. Bleeding is more prolonged, or presents recurrent episodes of varied severity. The 2 cases which occurred in this series are briefly summarized.

In general, medical therapy (ergotrate or pituitrin and bed rest) proved unsatisfactory in this series of cases. Surgical removal of the retained placental fragments is the treatment of choice. Separation by finger (curage) is the preferred method. If unsuccessful, the use of the curette or ovum forceps is safe. In the preoperative afebrile group of cases (24), 18 had a normal postoperative course, while 6 were febrile. In the preoperative febrile group of 7 cases, 2 were

afebrile following operation and 5 continued to have temperature. The prophylactic use of sulfonamides and penicillin is indicated pre- and postoperatively, and is imperative in the febrile group.

In the absence of placental fragments, late postpartum hemorrhage is rare. Two uterine factors present as causes: (1) late detachment of thrombi at the placental site with reopening of vascular sinuses and bleeding; and (2) abnormalities in the retention and separation of the decidua vera. In the second group, late postpartum hemorrhage is of mild type and, if recognized, curettage may be avoided.

Digital exploration of the uterine cavity is the first step in the treatment of late postpartum hemorrhage. Only by this method can a retained placental fragment be discovered and then removed. If no placental fragment is present, noninvolution of the placental site or separation of excessive amounts of decidual slough are the causative factors of the bleeding. 7 figures.

(Late postpartum hemorrhage is a subject which is long overdue for a paper since, despite its frequency, the condition has received little or no attention either in current literature or in our textbooks. These hemorrhages are often sudden and massive, may occur as late as three weeks postpartum and sometimes produce as severe a degree of shock as do the hemorrhages of placenta previa and abruptio placenta. As Wolfe rightly states, almost all of them are due to sudden partial separation of retained placental fragments and hence immediate curettage is indicated. A curious thing about many of these late hemorrhages is that on retrospect the report on the placenta usually shows it to have been intact. Accordingly, it may possibly be that a substantial number of these cases are due to retention of a succenturiate lobe.—Ed.)

## THE NEWBORN

### PREMATURITY FROM THE VIEWPOINT OF THE OBSTETRICIAN

NICHOLSON J. EASTMAN

Am. Practitioner, 1, 343, 1947

It is common knowledge that prematurity is the principal cause of death in the neonatal period, accounting for about one-half of all fatalities occurring at that time. During the past decade pediatricians and public health officials have made significant inroads on this toll, but they would be the first to affirm that the salvage, particularly in the smaller weight groups, is still discouragingly small. There are two main ways of attacking this problem. In the first place, mortality rates could be lowered substantially by wider dissemination of existing knowledge together with better distribution of personnel and facilities. This is a pediatric and public health responsibility. The other means by which premature mortality might conceivably be reduced is through the prevention of premature birth—obviously a challenge to the obstetrician.

It is the purpose of this paper to review the experience of the Johns Hopkins Hospital with premature birth during the past 20 years for the purpose of ascertaining, if possible, those factors which are most frequently responsible for this accident. In addition, opportunity is taken to discuss how premature labor may best be managed to the end that the infant will have the greatest likelihood of survival.

Between June 1, 1926 and December 31, 1945, among 28,493 total deliveries, 3331 premature infants (1000-2499 Gm.) were born—giving a gross incidence of 11.7 per cent. Of these premature infants 11.9 per cent were associated with multiple gestations; in about 90 per cent of these multiple pregnancies the onset of labor was spontaneous, in the remainder operative. In 14.3 per cent of the total cases, premature delivery of single infants was effected artificially because of maternal disease, chiefly because of toxemia, placenta previa and abruptio placentae. The remaining 73.8 per cent, or approximately three-quarters, were cases in which the premature labors were of spontaneous onset and the pregnancies single. What caused labor to start prematurely in these 2457 gravidæ? In evaluating this question it is important to recall that the simple association of premature labor and some complication of pregnancy does not necessarily mean that that complication was the cause of the premature parturition. Such a causal relationship can be postulated only if it can be shown that a given complication precedes premature labor much more frequently than would ordinarily be expected. This type of relationship could be established definitely in only 14 per cent of this last group. The diseases most frequently responsible for the onset of premature labor were chronic hypertension, syphilis (in negroes), abruptio placentae, placenta previa, heart disease and eclampsia.

The author now adds up the known causative factors which were demonstrable in this series and which have been discussed in the above paragraph (multiple gestation 11.9 per cent; maternal disease necessitating operative termination of pregnancy, 14.3 per cent; maternal disease, spontaneous onset of labor, 10.3 per cent of total; and congenital abnormalities, 1.6 per cent). To sum this up, in the whole series of 3331 premature infants, a definite cause for the early termination of pregnancy was demonstrable in only 1269 or in 38.1 per cent.

Inquiry is now made into what could have been the cause of the premature labor in the remaining 60 odd per cent of the cases. He shows that the incidence of prematurity in his material at least was closely related to economic and social level, the incidence being 50 per cent higher in white ward than in private patients, and in negroes two and one-half times as high. He was also able to demonstrate that in women with no or poor prenatal care the frequency of premature birth was 24.9 per cent whereas in women with good care it was only 7.8 per cent. After exploring various possible explanations for the above findings, the conclusion is reached that dietary deficiencies are probably the most important single factor in the causation of premature labor.

The total mortality rate for premature infants for the 20 year period was 24.1 per cent. In the last 10 year period this has fallen to 20.9 per cent and during the most recent 5 year interval to 18.7 per cent. All figures are uncorrected and include both stillbirths and neonatal deaths.

On the basis of the above study plus general clinical experience, the author believes that premature mortality could be lowered substantially if practitioners of obstetrics would act on the following suggestions:

1. Expectant mothers everywhere should be apprised of the desirability of an amplified diet in respect to minerals, proteins and vitamins. Although the role of nutritional deficiency in the etiology of premature birth does not lend itself to absolute proof, the evidence presented in this paper, original and otherwise, can leave little doubt that poor diet is probably the most common cause of this complication. At the risk of belaboring a well-known point, let it be re-emphasized that pills and capsules are no substitutes for the minerals and vitamins found in natural foods and that the daily menu of every pregnant woman should contain liberal amounts of milk, meat, green and yellow leafy vegetables, citrus fruits and whole wheat bread and cereals. Surely, this preventive approach to the premature problem promises to yield far more in terms of infants saved than all the refinements of pediatric therapy can possibly achieve. In this connection it will be instructive to recall that the outlook for a full-term baby born alive is ten times better than a premature baby even though the latter belongs to the most favorable weight group.

2. Vitamin K should be administered to all women as soon as labor starts. This statement is made with full realization of the skepticism with which some obstetricians regard this procedure. However, the author's Baltimore experience, now extending over some eight years, affords proof positive that in this community, at least, hemorrhagic disease of the newborn is relatively com-

mon and can be prevented by the antepartum administration of vitamin K. It is his opinion, moreover, that his dramatically lowered mortality rates during recent years, both for mature and premature infants, are in part attributable to this routine.

3. Although the obstetrician must be wary, it seems likely that certain cases of placenta previa and some patients with mild pre-eclampsia might be carried nearer to term than has heretofore been customary and this without increased risk to the mother. If patients can be brought to within five weeks of term, the outlook for an easily viable, approximately 2200 Gm. baby is good.

4. Patients who rupture their membranes prematurely should be left alone, preferably in the hospital, and no attempt made to bring on labor. They will often go for weeks with ruptured membranes and finally go into labor near term without event. The chief potential danger is intra-uterine infection, especially if coitus should take place. If all possibility of the latter can be eliminated, the patient can stay at home.

5. Patients in premature labor should be permitted no form of analgesia except continuous caudal or spinal anesthesia. Continuous caudal is ideal.

6. Likewise, the delivery should be effected by caudal, spinal or local infiltration anesthesia.

7. Delivery should be preceded by a liberal median episiotomy.

8. In the author's opinion, the best way to effect delivery of a premature infant—especially a small one—is as follows: with the head on the perineum and the vulvar ring just beginning to distend, a median episiotomy is made and this is followed by gentle fundal pressure. This usually suffices for most cases but with some of the larger prematures, gentle forceps extraction may be advisable. When possible he prefers spontaneous delivery, assisted by fundal pressure, to forceps. In this connection, it should be noted that statistical studies of forceps vs. spontaneous delivery in premature labors are subject to an inherent error because it is the larger babies—those with the better prognosis because of gestational age and size—which most often call for forceps extraction. Obviously, therefore, most forceps series are weighted with the larger babies and hence tend to show “statistically” better results, but ones which we know are misleading for the reason stated.

9. The cord should not be clamped until pulsations cease since these infants, due to their tendency to develop anemia, need all the blood they can get.

10. The infant now becomes a pediatric problem, but it should be remembered by obstetricians as well as pediatricians that the main immediate desiderata are: a clear airway, oxygen, warmth and as little handling as possible.

CLAVICLE FRACTURE OF THE NEWBORN IN  
VERTEX PRESENTATION

A STUDY BASED ON 86 CASES

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Acta Obstet. et Gynec., Scandinav., 26: 321, 1946

This paper is an account of 80 cases of clavicle fracture which occurred in a series of 2450 deliveries. This represents an incidence of 3.3 per cent of all infants born and 3.5 per cent of the infants born spontaneously in vertex presentation. The midwives assisting in the deliveries were those of the permanent staff or acting district midwives. In addition to the above, there were 6 fractures in babies delivered by forceps, or 8.2 per cent of 73 forceps deliveries. In the breech deliveries during the same period only 1 case of clavicle fracture was observed. The author reviews some of the Danish and German papers on this accident and finds that the incidence ranges in those reports between 0 and 1.4 per cent, but believes that in certain series, at least, the figures were not based on careful, systematic examinations of the infants.

In all cases the fracture occurred at the junction of the middle and lateral thirds of the clavicle. These fractures are easily overlooked. In some cases there was distinct dislocation and crepitation even at birth, but in others no such findings could be noted during the first few days even by careful examination. In every case a pronounced swelling developed around the fracture in the first days of life. This may be the only clinical symptom even in the presence of extensive dislocation. Another reliable sign is diminished prominence of the medial convexity of the clavicle. Still another sign is absence of Moro's reflex: on being disturbed as by hitting the table on which the child lies, a normal newborn infant will make a movement as to catch something with both arms. If the clavicle is fractured the child will frequently keep the arm of the injured side still. In the author's series this reflex was tried in 75 cases: it was distinct in 20 only, diminished in 19 and wholly negative in 36.

The clavicle of the anterior shoulder is most frequently fractured. Assuming that the fractures were connected with the pulling of the head of the fetus, one author (Hauch: Zbl. Gynak., 29: 1025, 1905) forbade any such pulling and thereby reduced in 1 year the frequency of fractures from 1.3 to 0.67 per cent; pressure on the fundus rather than traction on the neck was used.

The author regards the prognosis of these fractures as excellent even without treatment. Aside from its medico-legal aspect, this accident accordingly is of little clinical importance.

BIRTH INJURY OF THE PENIS, SCROTUM AND BUTTOCKS  
RESULTING IN GANGRENE

HARRIET W. NIELSON, G. B. LOGAN AND D. O. FERRIS

Proc. Mayo Clin., 21: 510-511, 1946

A white infant was admitted to the hospital 24 hours after home delivery. At the time of delivery, by breech, the scrotum was about the size of a small grapefruit and the penis red and swollen to about 4 times its normal size. Physical examination on admission revealed an infant weighing 3,260 gm. The penis, scrotum and buttocks appeared gangrenous. The penis was red and swollen to 3 times its normal size; the scrotum was swollen to a diameter of about 8 cm. and was a dark reddish blue. Gangrenous areas were observed on the right and left buttocks.

A support was applied to the scrotum, penicillin (5000 units) was given intramuscularly every 3 hours for 39 days and warm, moist sterile dressings were applied for 16 days.

The foreskin of the penis sloughed off leaving an apparently normal glans. The gangrenous area of the buttocks sloughed off on the eighth day. Gangrene involved  $\frac{1}{3}$  of the scrotum. Twice an attempt was made to imbed the testes and bring together the edges of the scrotum. The right testis was thought to be devitalized but was not removed; the left was considered viable. The wound healed and the patient was discharged on the fortieth hospital day.

The surgical treatment in this condition consists of removal of devitalized tissue and covering of denuded structures. The most interesting point which the authors stress is that loss of tissue in the scrotum is of tunica dartos as well as of skin and that a small amount of scrotum can be coaxed into a full-sized scrotum in time.

STILLBIRTH AND NEONATAL DEATH: A CLINICO-  
PATHOLOGICAL STUDY

MARY EVANS AND G. S. SMITH

J. Obst. &amp; Gynaec. Brit. Emp., 53: 440-452, 1946

This paper is based on an analysis of autopsy findings in 373 cases of stillbirth and neonatal death, correlated with observations on the mode of delivery and any relevant maternal conditions. The period covered is that between viability of the fetus (28 weeks' gestation) and the end of the fourth week of life. Any fetus or child weighing  $5\frac{1}{2}$  pounds or less has been recorded as premature. Of the 373 cases, 223 were livebirths and 150 were stillbirths.

In 64 cases (16.1 per cent of the total) intracranial hemorrhage was shown to be the cause of death. Fourteen of these resulted from forceps delivery, 7 from



breech delivery, and 4 from internal version and breech extraction. In the remaining 39 cases (60 per cent) spontaneous vertex delivery occurred. Of these, 6 had prolonged labor, one had a very rapid delivery, and 4 had labor induced by combined drug induction and artificial rupture of the membranes. In the remaining 28 cases nothing abnormal was observed about labor or delivery. It is considered that an episiotomy would save some of the premature fetuses and probably some of the others.

There were 101 cases in which asphyxia was the cause of death (36 per cent of the total). In 24 of these there was accidental antepartum hemorrhage or placenta previa, and asphyxia was due to interference with the blood supply at the placental end. Definite maternal toxemia was present in 14, and in many of these there was a sufficient degree of placental infarction to cause asphyxia; prolonged labor was a factor in another 7 cases. In 17 cases asphyxia was attributed to cord complications. In spite of the usual precautions, there were deaths due to the cord being tightly wound around the neck. In 41 of the 101 cases no cause for the asphyxial signs was found. Probably a certain number could have been prevented by more careful auscultation of the fetal heart during the second stage of labor.

Twenty-three infants died of atelectasis. Prematurity was undoubtedly a factor in 17 of these cases. No less than 43 per cent of the groups with asphyxia and atelectasis were premature. Many of the cases in these groups are due to antepartum hemorrhage and are largely unavoidable, but the importance of careful auscultation of the fetal heart during the second stage of labor is again stressed. Steps could then be taken to hasten delivery if this were indicated.

In this series infection was considered responsible for 72 (19.3 per cent) of all deaths, or 31.7 per cent of those in the neonatal group. More than half of the deaths were due to respiratory infections, more generally staphylococcal. The majority occurred during the first 2 weeks of life. Most were considered to have been due to airborne infection. The authors have concluded that it is justifiable to give penicillin as soon as an infant begins to go off its food. In one of the hospitals from which these cases were taken the babies, except for pre-matures, are nursed at the mother's bedside, and not packed together in nurseries. There were 6 cases of gastro-enteritis, 4 of meningitis, 3 of peritonitis (cause not found) and only 2 of congenital syphilis. In this group where infection was the cause of death prematurity is again an important factor. The value of more careful nursing is brought forth.

There were 34 deaths ascribed to miscellaneous causes. Twenty of these were of erythroblastosis fetalis (icterus gravis) and an additional 3 of hydrops fetalis. The writers indicate that routine examination of all pregnant women for the Rh factor and careful watch and prompt treatment of the infants of Rh negative mothers are the necessary measures.

In 39 cases (10.7 per cent of the total) congenital malformations were responsible for death. The writers have found no supportive evidence in this group for the relationship between maternal rubella and the incidence of congenital defects.

A separate analysis of figures for one year is given for comparison with the full series.

## ANOXIA NEONATORUM

C. L. SULLIVAN

New England J. Med., 235: 894-896, 1946

In this paper the author discusses the care of the fetus during labor and evaluates the treatment of anoxia caused by failure of respiration after birth.

In considering the care of the fetus during labor, the length of labor is of the utmost importance; anoxia is most frequent in labors under 3 or over 30 hours. If a labor lasts longer than 30 hours, it is in the best interest of the fetus that it be terminated spontaneously, without operative interference. During labor the fetal heart should be checked every 15 minutes during the first stage, and after every other contraction at the end of this stage and during the second stage. Any deviation in rate from the accepted normal range of 116 to 160 should receive immediate treatment by the administration of pure oxygen to the mother. For spontaneous or outlet forceps delivery, especially in the face of previous medication, an absolutely minimal amount of anesthesia should be used. Nitrous oxide and oxygen should be used in concentrations of 50 per cent each, with a few short inhalations of ether if this is not sufficient. As the head crowns, pure oxygen should be given to the mother and continued after birth until the cord ceases to pulsate. In any delivery more serious than outlet forceps, spinal anesthesia is best from the standpoint of anoxia neonatorum.

The greatest single factor contributing to anoxia neonatorum and complicating about half the 4 to 5 per cent of neonatal deaths is failure of the onset of respiration after birth. Respirations should be established within 30 seconds after birth. Absence of muscle tone in the newborn indicates a dangerous state of anoxia requiring immediate treatment. The severity of anoxia is best judged by Flagg's classification into 3 stages—depression, spasticity and flaccidity, occurring in that order of frequency and severity.

In the depression stage the infant does not breathe well and there is a tendency to duskiess and recurring cyanosis. Muscular tone is good and the cord pulsates strongly. The infant should be placed in a slightly inclined position with the head downward and the mouth and pharynx cleared by suction. Body heat should be maintained and pure oxygen should be administered until the skin shows a pink glow. If the baby still does not become vigorous, with deep respirations and a cry, carbon dioxide may be administered by mouth insufflation.

The second degree of anoxia, spasticity, is more serious in nature. Irregular, gasping or shallow respirations occur at long intervals. Reflex action is still present; muscle tone is present but diminished; there is marked cyanosis of the mucous membranes; froth or fluid is present in the mouth. Treatment includes

those general measures employed in the depression stage. Oxygen should be given, preferably by a positive- and negative-pressure machine, regulated to 30 or 40 discharges a minute. The machine should be used only until the skin becomes pink and respirations regular. If the baby becomes pink but does not increase its respirations or cry, 5 per cent carbon dioxide should be resorted to. In the absence of a resuscitator, mouth-to-mouth breathing should be initiated at once and maintained until spontaneous respiration is established. For protection against rupturing the alveoli during this procedure, the operator's hand should be placed over the thoracic cage of the infant, and there should be only a minimal excursion of the chest wall with each breath blown.

The third stage of flaccidity indicates a most precarious stage of shock, with circulatory failure. Respirations occur at long intervals or cannot be demonstrated. Pallor or a gray cyanosis is present; there is complete lack of muscle tone; the apex beat may or may not be demonstrable; there is no pulsation of the umbilical cord. Treatment should include the measures outlined above, with the important addition of intubation, at first with suction and then with insufflation of gases. Without intubation, it is impossible to give the infant an adequate supply of oxygen before irreparable damage has occurred to the nervous system.

All infants requiring treatment for anoxia should be given the same meticulous care as premature infants and should be placed in an incubator at a temperature of approximately 90 degrees F. with continuous oxygen for 6 to 12 hours, being under careful observation.

### THE ENCEPHALOPATHY (KERNICTERUS) OF ERYTHROBLASTOSIS FETALIS, ITS SEROLOGIC DIAGNOSIS AND PATHOGENESIS

A. S. WIENER AND M. BRODY

J. Nerv. & Ment. Dis., 104: 674-681, 1946

Most of the studies on kernicterus describe a severe or fatal neurologic syndrome as a complication of a neonatal jaundice in infants with normal parents. Until recently there was no adequate explanation for this peculiar combination of brain and liver disease.

Since the discovery of the Rh factor by Landsteiner and Wiener, Levine suggested that the Rh factor was the antigen at fault in erythroblastosis. In order to prove serologically that Rh sensitivity exists, it is necessary to demonstrate in the mother's blood antibodies that react with factors in the infant's blood. Recent work indicates that there are 2 main types of antibodies. One is bivalent and causes agglutination. The other is univalent and requires special technics for its demonstration. The authors have found that in nearly all of their cases in which kernicterus or neurologic sequelae occurred they could demonstrate the

presence of bivalent antibodies (agglutinins) in the mother's blood. This led to the hypothesis that the type of antibody determined the nature of the disease. The writers' theory proposes that agglutinins formed in the mother's serum traverse the placenta, mainly during the muscular activity of birth, and produce agglutination thrombi in the vessels of the infant. In the lung, such thrombi can produce pulmonary hemorrhage. In the bone marrow, these thrombi stimulate the formation of erythroblasts even in the absence of anemia. In the liver, jaundice is increased. In the brain, the agglutination thrombi cause tissue damage and destruction. The damaged and destroyed brain tissue then picks up the bile pigment. Postmortem examinations in 3 cases of kernicterus seem to confirm this theory.

The examination of 3 cases of Wilson's disease failed to demonstrate any evidence of isoimmunization. Therefore, the authors' theory does not account for all instances of liver-brain disease.

Discussants on this paper are T. J. Putnam, P. Levine, J. H. Globus and L. H. Cornwall.

## THE NEWBORN, HIS FAMILY AND THE MODERN HOSPITAL

J. C. MOLONEY, J. C. MONTGOMERY AND GENEVIEVE TRAINHAM

Mod. Hosp., 67: 43-46, 1946

Today the evidence of the influence of early childhood experiences upon the personality and mental health of the older child and the adult he becomes comes from many disciplines. Goldfarb found that children whose infancy had been spent in institutions showed a significantly higher percentage of overtly anxious and aggressive behavior. Pediatricians have observed that "problem children or spoiled children" are the products of a regime which has denied them adequate mothering. The period of hospitalization of mother and newborn offers a great opportunity to instruct the new mother in child care and to help her become more familiar with her baby. Present hospital practice too often completely ignores these opportunities, the mother being separated from her baby and breast feeding discouraged. The writers, without surrender of any of the gains already realized, believe that a complete reorganization of the hospital care of mothers and babies must be undertaken.

Three Detroit hospitals and one suburban hospital in the Detroit area have experimented in certain selected cases with a "rooming-in" plan which permits the mother to have her baby at her bedside where she can get to know him and actively participate in his care. It is believed that this early close relationship between mother and infant is beneficial to the mother, father and child for a number of reasons.

First, when the hospital takes over the infant's care completely, it robs the mother of her opportunity to fulfill a basic psychological need, that is, to be

useful to her child. Second, when mother and baby room together the mother learns to interpret her baby's demands and to become considerably skilled in caring for him before she leaves the hospital. Thus; mother, father and child escape the unfortunate results of the inevitable fears which come to the completely uninitiated mother when she goes home. Third, the father is able to enjoy his child in the hospital, rather than to feel completely shut out of his family by doctors and nurses.

The baby left at his mother's bedside is much more likely to be breast fed. The mother may observe her baby's own hunger rhythms and allow him to suck when he is actually hungry and most vigorous in his efforts. The nutritional and physical advantages of breast feeding are briefly discussed. In addition to these, the breast fed baby begins to exercise his own powers and to find satisfaction in them. "Pleasures of nursing result from satisfaction which comes from the exercise of emerging powers" (Aldrich). The close physical contact received by the baby who stays in his mother's room satisfies the organic needs of any young mammal—close tactual contact, cuddling, etc.—needs which arise from the lack of homeostatic capacity in the newborn.

It was found that the infants on the rooming-in plan cried less. It is also believed that they are safer from infections than the infant in a crowded nursery. Nursing care time was reduced by the plan.

## OPERATIVE OBSTETRICS

### EXTRAPERITONEAL CESAREAN SECTION; INTRAPERITONEAL APPROACH; PRESENTATION OF THE AUTHOR'S TECHNIQUE

R. A. CACCIARELLI

Am. J. Obst. & Gynec., 53: 100-108, 1947

The author proposes a type of cesarean section which aims to expose the retrovesical and infraperitoneal portion of the lower uterine segment by utilization of a small incision into the peritoneal cavity just above the abdominovesical reflection of peritoneum. Nothing of an original nature is claimed for this method, but it does claim to be an improvement over the highly favored intraperitoneal lower segment operation which utilizes 2 flaps of peritoneum.

Through a midline incision in the abdominal wall the recti muscles are dissected from their sheaths and retracted laterally. The transversalis fascia and the peritoneum are incised vertically for about one or one and one-half inches; the lower end of this incision reaches a point about one-half inch above the parieto-vesico-peritoneal reflection. The peritoneal edges are grasped by forceps applied laterally. The wound is spread out in a transverse fashion, thus raising the bladder and bringing it more clearly into view. The peritoneum is then separated from the bladder by sharp dissection with the scalpel, starting in the midline, then proceeding to the left bladder angle and then to the right bladder angle. This is carried out under direct vision and is made easy by one or 2 fingers within the abdomen, lifting up and putting the peritoneum on a stretch. Once the fundus of the bladder has been freed of its peritoneum, the latter will now strip off the rest of the bladder with a gauze sponge until the vesico-uterine reflection of peritoneum is reached. This tongue-like fold of peritoneum which looks like a hernial sac must not be injured. By pushing upward on this fold and pushing downward and to the right on the bladder, the lower uterine segment covered with its fascia is seen. The fascia is incised about  $\frac{3}{4}$  of an inch inferior to the zone of peritoneal reflection. The incision should extend equally on both sides of the midline, and should be larger than the proposed uterine incision. A finger is inserted under the upper flap of fascia and, by pressure, this part of the fascia with the peritoneal tongue is raised off the lower uterine segment. A finger is inserted under the lower fascial flap pushing with it the bladder downward and to the right, exposing a fairly large space through which a crescentic incision is made in the lower uterine segment. This incision should be large enough to admit the closed fist with ease. All retractors are removed and the baby is extracted. The writer prefers extraction by the breech in the vast majority of cases.

Nineteen consecutive cases of two-flap cesarean section (Group I) are compared with 19 cases of cesarean section performed by the technique described in

this paper (Group II). In Group I the average operating time (excluding additional operations) was 25 minutes. The average stay in hospital was 10.8 days. Abdominal distention occurred in 6 patients, and urinary complaints were present in 4. In Group II the average operating time (excluding additional operations) was 32 minutes. The average stay in hospital was 9.8 days. No patient in Group II had postoperative distention and only one patient was unable to void for one day only.

(We have tried this in two cases and like it very much. It simplifies and shortens greatly the separation of the bladder peritoneum,—a difficult and tedious step for many operators. But with the prophylactic use of penicillin before and after cesarean section in potentially infected cases, we find rare occasion for the extraperitoneal operation.—Ed.)

## SOCIAL AND LEGAL ASPECTS

### ARTIFICIAL INSEMINATION: ITS MEDICOLEGAL IMPLICATIONS

#### *A SYMPOSIUM*

Am. Practitioner, 1: 227-241, 1947

#### MEDICAL ASPECTS

J. P. GREENHILL, M.D.

By artificial insemination the author means the introduction of semen into the genital tract of the female without sexual intercourse. There are two types of artificial insemination, one in which the husband's semen is used, and the other one in which semen obtained from a donor is employed. The use of a husband's semen is a medical problem and one need not be concerned about legal entanglements. On the other hand, many questions arise when semen from a person other than the husband is used. There are not only legal but religious aspects as well.

After discussing fully and clearly the indications, contraindications and technique of artificial insemination, the author discusses the legal aspects as follows: Beardsley pointed out that the Supreme Court of Ontario in 1921 sustained a charge of adultery in a case in which donor semen was used in artificial insemination. Folsome emphasizes that in addition to the charges of "adultery in the test tube" the child may be declared illegitimate and many legalities may surround any of the parties involved in the procedure. The donor may be named the correspondent in a divorce case by the husband and the donor may become a contender in inheritance litigation should he learn the identity of the child. Adoption proceedings while assuring some degree of safety to the child provoke undesirable publicity which may frustrate the very purpose for which artificial insemination was initiated; that is, to produce a child from a childless couple. Folsome maintains that until public opinion is molded and safe and sane legal rules coupled with court opinions have removed the legalistic impediments from artificial insemination using donor's semen, it seems obvious that any system of affidavits based on embarrassing confidences are worthless as protection for any of the parties concerned. However, Cary believes that a simple written consent signed by the husband and the wife and histories filed indicating that both parties have submitted to preparatory examinations should constitute adequate protection. Seymour and Koerner insist on having the husband and the wife sign an elaborate document.

A very significant editorial in The Journal of the American Medical Association stated in part:

"The fact that conception is effected not by adultery or fornication but by a



method not involving sexual intercourse does not in principle seem to alter the concept of legitimacy. This concept seems to demand that the child be the actual offspring of the husband of the mother of the child.

"Some advise that all question as to the legitimacy of a child produced from the semen of a male other than the husband of the mother be ignored, apparently relying on the secrecy attendant on artificial insemination and on the presumption of law that a child born during wedlock is legitimate. Such reliance, however, disregards the apparent intent of the husband to confer on the child the rights incident to legitimacy. Those rights, if illegitimacy or even doubt as to legitimacy is frankly recognized, can be assured by adoption proceedings, which ordinarily are comparatively simple.

"In many instances of artificial insemination, perhaps in a great majority, the facts may never be known to any one other than husband and wife and the physician involved. There is the possibility, however, that interested relatives may learn of the circumstances and may procure the evidence necessary to overcome the presumption of legitimacy and may thus deprive the child of a share of intestate property. It is the just due of the child that false pride or considerations of delicacy be put aside and that it be given, through adoption proceedings, the protection intended by the husband of the mother when he consents to the artificial insemination of his wife."

*Conclusion.* The first thing to be done in the matter of artificial insemination in which a donor's semen is used is to clarify the legal aspect. When the husband's semen is used there is, of course, no legal question. Should the courts decide, however, with some degree of unanimity, that artificial insemination of a woman with a donor's semen constitutes adultery then we physicians will have to discontinue performing this procedure. Even though there is great secrecy about the matter and the couple is elated with their baby, one never knows when a husband may change his attitude toward the offspring. At the present time we are gambling because there are no legal rulings, except one, against the procedure.

Should the courts decide that artificial insemination is a purely medical and social problem and involves no legal entanglements, then we may safely continue our humanitarian efforts.

#### LEGAL ASPECTS

JAMES F. WRIGHT, Esq., Member, Chicago Bar Association

When a third-party donor is used in artificial insemination, then the doctor, to protect himself, must naturally obtain the consent of his patient, the prospective mother, and he should also obtain the consent of the husband. Subsequently something might develop to cause the husband to institute legal proceedings against the doctor, saying that this had been performed without his consent, and that he had been damaged or aggrieved by the technic. Those consents should be in writing and should be witnessed, for the doctor's own protection. When a doctor uses some third party as the donor, he should obtain the consent of the donor himself, so that that donor will be stopped to say that

some fraudulent practice has been perpetrated upon him and that he has been used in an experiment.

We must, of course, look to the status of this offspring. Under the decisions of this state, a married woman's child begotten by one who is not the husband of its mother is, in the language of the courts, a bastard. The true test in determining—he is quoting from the Illinois courts—whether a child born in lawful wedlock is legitimate, is whether the husband of the woman who gives birth to the child is its father.

The courts of this state and many others have held that the law does not impose upon the husband any duty to support or contribute to the support of his wife's bastard child. Now you may easily see why this practice of artificial insemination may from the standpoint of the state be considered dangerous. Who will support this child, if not the husband of this mother who produced the child? Will it be thrown back on to the state, or on to society in general, or will it be up to the mother to furnish support?

You may also consider the situation that might occur where both the husband and wife agree to have the wife artificially inseminated by sperm from someone other than the husband, both having agreed because they thought it impossible for the husband to become a natural father. It has been stated here that tests can be made. Maybe they are accurate; and maybe some of the tests are not so accurate. Just suppose that here is a woman who does have a child by this method, thinking that the husband could not be a natural father, and that after that child is born, they have a natural child of their own. How about that first child? How is he to be treated? Is he to be pushed aside because the father is aware of the fact that the last child is his and the first one belongs to someone else, whom he doesn't know? That may lead to a disruption of the marriage. That may lead to a separation. No one can tell. But it raises a problem, and a problem that must be considered.

It has been said that the essence of the offense of adultery consists not in the moral turpitude of the act of sexual intercourse, but in the voluntary surrender to another person of the reproductive powers or faculties of the given person. Any submission of those powers to the service or enjoyment of any person other than the husband or wife comes within what many writers have declared to be the true definition of adultery.

While I am fully aware that some of the articles written upon this subject have contended that it would not be adultery for a woman living with her husband to produce by artificial insemination a child of which some man other than her husband is the father, it seems to the author that that is a most erroneous conclusion. If such a thing has not been declared by our courts to be adultery, he, for one, believes it should, on the grounds of public policy, if for no other reason,

If it is wrong to artificially stop a life by abortion when no real medical need exists, then why is it not likewise wrong to start a life artificially? Certainly the human life is not a toy to be started or stopped through some whim or caprice. There are those, and the author thinks they are legion, who believe

that there is something sacred about life, just as there is about the marital relationship. He realizes that he was not asked to deliver a sermon, but what is the law founded upon except upon good morals?

The author believes that some one of the numerous committees of the legislature should be appointed to give the subject some study and to report its findings. Until the lawmakers have acted and until the courts have ruled, we may be guided by a law that is all too often not referred to, and that is the moral law. In considering our subject tonight, it seems to me that that would be the law to follow. A very good definition was recently given by a court, when it said: "The moral law is the eternal and indestructible sense of justice and of right written by God on the living tablets of the human heart and revealed in His Holy Word."

### DISCUSSION

Chairman Morris Fishbein, Chairman and moderator of this symposium presented October 16, 1945: "We are dealing here with a process in biology in which there are already accumulated many thousands of cases in medical records, although there may be very few cases in legal records. Obviously any group of lawmakers following the suggestion of Mr. Wright, would have to assemble scientific evidence before it endeavored to pass legislative enactments affecting the process. If they did not, they would be passing legislative enactments upon an emotional, rather than a scientific basis, and in scientific questions, we try as far as possible to keep away wholly from the emotional aspects of the subject, although even in courts of law it is very frequently difficult to avoid being emotional."

Dr. William C. Danforth: "I cannot personally feel any great degree of enthusiasm for it. I would rather not do it. The reasons for not doing it have already been set forth. Technically, of course, it can be done with due care on the part of the physician, with a reasonable degree of safety. The legal aspects of it really impress me very deeply. I am sorry I cannot talk any more authoritatively or any more at length about it, because my experience, as I say, has been very small. I think definitely the moral point of view is one we must consider very seriously; and I agree with the suggestion of Mr. Wright that, inasmuch as the procedure is now being used fairly frequently, there ought to be some study by the legislative body concerning it so that we may have some basis of law upon which to go."

Mr. Royal W. Irwin (Attorney): "I have often marveled at the large families that some couples have brought into the world purely selfishly. A husband and wife decide between themselves that they want a child, purely selfishly. They are not thinking of the interests of that child that they are bringing into this world; they are thinking only of the pleasure that they will have as father and mother in raising that child. Whether posterity will be benefited by the bringing into the world of this child is a matter of no concern to them. They have a child because they want it, because they feel that they—they, not the child—will be happier by having this child. Extending that one step further

in the question of artificial insemination, it seems to me that possibly from a moral standpoint, we ought to consider the rights of this unborn child that they are so eagerly attempting to accomplish, so eagerly attempting to bring into this world against its own will. Whether they are financially able to take that child and raise it; whether they have the moral background that is necessary to give the child the right start—all of those questions are not considered. It seems to me that this matter of artificial insemination is but the outgrowth of selfishness on the part of persons."

Dr. Alfred Koerner: "As a representative of the Bar of the State of New York and also as a practicing physician, I want to tell you that after some twelve years of work with it, there are many things to be said about it. Dr. Greenhill, quoting Dr. Beardsley, cited the case of Orford v. Orford, appearing in 49 Ontario Law Reports. In that case, if you look it over, you will see that one Hotchkisson was found as a matter of fact by the court to have had carnal relations in the ordinary manner with the defendant. After finding that that was sufficient cause to grant a divorce in the action, the court felt constrained to consider artificial insemination, which at that point was no longer material, so after all, we as lawyers know that everything that is said from there on is *dicta* and cannot be taken as a basis for anything that has been adjudicated in this continent.

"The only adjudication of this continent of which I am aware is a very recent case occurring in your own city in which Judge Feinberg, of a Cook County court, had a case very similar to this Orford v. Orford, and he there allowed a divorce on the basis, again, of sexual relationships in the ordinary event. However, again as *dicta*, he considered the question of artificial insemination, as to whether it could be or ever was a cause for the judgment that adultery had been performed, or could support an action in divorce, and as *dicta*—and we admit that it is *dicta*—he ruled that it could not be. He said it could not be. There was no written opinion in that case. So there you have it, gentlemen. You have two cases of *dicta*, one on one side, one on the other. You may take your choice.

"We must remember that in this country one out of every ten married couples is involuntarily sterile. Gentlemen, that is a serious problem. That isn't a problem that we, the other nine—I hope we are the other nine—can easily wave aside. These people have a right to be considered. They are very numerous. They are much more numerous than the sufferers of poliomyelitis, about whom we make very considerable effort. Those people are married; they have decided to take each other for better or for worse. They want a family, and I will agree absolutely with the last speaker, insofar as it is a very essential element to discover whether or not the prospective parents are capable of supporting the child in a proper manner, before essaying to bring him into the world. But that is true of any couple, whether by artificial insemination or any other way.

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We like to consider that at least one of the parties who comes to us is on the verge of despair, many on the verge of divorce; that those people are, at least to the extent of 50 per cent, determined that they will have that child. Let us say the husband knows, or says, or commits himself in no way. The wife does. She comes there voluntarily, no one points a gun at her. She comes there herself and wants a child.

"We like to tell the husband what would happen if he refused, and if his wife was good enough to suggest adoption, and he agreed, 'This child would be a stranger to both of you, but in this way the child is semi-adopted, it is one of yours. As to the other it is adopted; you may so consider it.' "

Member: "I don't suppose we could expect very complete agreement on so controversial a subject. When this was mentioned to the committee of the Bar Association, of which I happen to be a member, I recall it was considered "too hot a potato" to handle at all in open discussion. I am glad to say the majority of the committee decided to the contrary.

"It seems to me—I can't very well speak from the standpoint of a mother—but it seems to me a woman might very well prefer to have a child who was her own, rather than a child she adopts. It seems to me a husband might very well prefer to have his wife have a child who is her own, rather than an adopted child. It seems to me a husband might have a greater love and affection for a child of that kind, a child in whom he can see the characteristics of the woman whom he loves. Certainly we are all agreed that no man should be called upon to assume the burden of supporting a child produced in this fashion, or born in this fashion, whom the man does not want to support. If, however, the man comes in willingly and says, 'We want children; instead of adopting a child we prefer to have a child; I prefer to have my wife inseminated,' I see no reason why in a dozen different ways legislation could not provide for it. After all, it wouldn't even have to be known. Perhaps a certificate filed with the physician, or a certificate recorded would be sufficient under legislation that would say that a child inherits not only if the child is legitimate, but also if the child results from artificial insemination with the consent of the parents."

Member: "I have tonight had confirmed my suspicion that lawyers are the most reactionary people in the world. Why shouldn't a woman who has a natural instinct for motherhood gratify that instinct? Why shouldn't someone born blind attempt to gain sight? Surely those of you who have perfect eyes wouldn't deprive me of the opportunity to wear glasses, so that I may see as well as you. Why, in this field, may not people aspire to obtain what they cannot have of their own volition. It seems to me that lawyers should affirmatively help in this program. True, the legal problems are most serious, but they can be overcome."

Dr. Greenhill: "The matter of adoption was brought up. Personally I see no need for adoption because the men who come to us want the matter kept secret. In spite of what one of the speakers says I do not know a single woman who was inseminated who ever spoke about it. Not a single one of my patients has even told her own parents about being artificially inseminated so that even

women who usually talk about everything do not mention their babies obtained by artificial insemination. Therefore no one in the neighborhood, be it the South Side or elsewhere, can find out about such babies. No baby has any stigma attached to it because its father is unknown. The husband certainly will not tell because it would reflect on his manhood. If a couple legally adopted a child born after artificial insemination anyone could see the adoption proceedings. As I said that is just what the couples in question do not want. They do not want anyone to know that the baby is not entirely their own.

"A physician should have a heart-to-heart talk with couples who desire artificial insemination and select only a few at a time. If I were to take all such patients who come to me I would not have time to be here tonight. That is true of all specialists in this line of endeavor. I do not know what the incidence is of the couples I accept but it is extremely low. After the talk I try to decide on the basis of the morals of the people concerned, their education and their health. Although financial stability is important it should not play too great a role because we all know that there are plenty of poor people who raise children properly, and many rich people who are failures at rearing children.

"I believe artificial insemination is a humanitarian procedure. If you could see the real pleasure of these couples when they have a baby, I am sure you would agree that they have as much right to that happiness as anyone else. In closing I make a plea to you lawyers to tell us physicians whether artificial insemination is legal or illegal. If it is illegal we shall stop this procedure. If it is legal or you give us no opinion, we shall continue to help bring happiness to the couples who desire and are worthy of it."

(The above abstract, although very long, covers only about one-fifth of the original article and has seemed to merit inclusion not only because of the timeliness of the subject but also because no other paper to my knowledge has so thoroughly covered the medicolegal pros and cons of this issue.

It is worth noting that shortly after the above symposium was held, and quite independently, The Public Morality Council of England published a series of lectures on this topic. In this, as in the above symposium, artificial insemination was on the one hand branded as adultery and on the other extolled as a way to brighten childless homes. The council, sponsored by churches and sociologists to study morality problems, published these lectures delivered at a private conference in April, 1946 in the hope that readers might "arrive at a balanced judgment of their own."

The issue is important in England because of the declining population, a high rate of childless marriages, and the number of unmarried women and young widows deprived of husbands and children by the war.

Most churchmen said artificial insemination is "degrading," and adulterous unless the donor is the woman's husband.

Doctors who treat couples unable to reproduce normally said artificial insemination, either by the husband or a stranger, was "often justifiable because it will bring into many homes happiness where unhappiness previously existed and tends not to destroy but to safeguard the marriage."

Lawyers said children born after artificial insemination by a stranger are illegitimate.

A sociologist, Prof. E. O. James, of London University, said artificial insemination by a third person jeopardized rather than safeguarded marital happiness.

One practitioner, Dr. Mary Barton, said there have been 300 "test tube" babies born in



England in the last five years after artificial insemination by strangers and "thousands" born after artificial insemination by husbands.

Dr. Barton, a gynecologist who has arranged artificial inseminations, said ten per cent of all British marriages were infertile and adoption, in 70 per cent of the cases, would not satisfy the woman's maternal instincts.

The Rev. J. C. Heenan, Roman Catholic, and the Rev. G. L. Russell, Church of England, condemned the practice.

On both sides of the Atlantic, accordingly, the artificial production of pregnancy is becoming an even stormier issue than its artificial prevention. There can be no question that the obstetricians who approve and practice this procedure are conscientious and sincere and have but one objective, the happiness and welfare of certain childless couples. Here in Baltimore it is customary for them to make little or no charge for artificial insemination in order to do away with any thought of mercenary motives. However, when one thinks of all the multitudinous complications, legal and otherwise, which may eventually befall the offspring, one cannot help wondering whether Sir Walter Scott, if alive today, could find anywhere a better example than artificial insemination for his famous lines: "Oh, what a tangled web we weave when first we practice to deceive."—Ed.)

## THE STERILIZATION OF THE INSANE AND MENTALLY DEFICIENT IN NORTH CAROLINA

W. P. RICHARDSON AND C. J. GAMBLE

North Carolina M. J., 8: 19-21, 1947

North Carolina's present sterilization law was passed in 1933, and provides for a Eugenics Board which considers the evidence indicating the desirability of the operation and decides whether it falls within the causes specified in the law. At the end of 1945 the Eugenics Board reported a total of 1722 sterilizations. For a large proportion of these individuals the operation has meant release from segregation and consequently a reduction in the drain on the taxpayer's resources. However, the estimated total number of mentally defective persons in the state is 71,000, showing that the sterilization program under the Eugenics Board has touched less than one in 41 of potential parents who are mentally defective.

Comparison with other states shows that at the end of 1945, the numbers of tubectomies per 100,000 population have been as follows: Delaware, 250; California, 231; Virginia, 175. North Carolina, with 45 sterilizations per 100,000 population ranks fifteenth. In an extensive sampling, Selective Service found the proportion of rejectees among selectees higher in North Carolina than in any other state.

The continued and effective use of sterilization in a greater degree by other states suggests that North Carolina might well apply the procedure more extensively for the protection of its present and future generations. Each physician in the state can help make this more widespread application possible by letting his patients know that, except for the impossibility of parenthood, sterilization involves no change in sexual functions or characteristics. 1 figure.

SOME FACTORS CONCERNING STERILIZATION BASED UPON A  
STUDY IN ORANGE COUNTY, NORTH CAROLINA

G. H. LAWRENCE

North Carolina M. J., 8: 22-24, 1947

The present study was undertaken to find out as specifically as possible the extent of mental disease and mental deficiency in a fairly typical North Carolina county. The study is as yet by no means completed.

A study of the Selective Service records shows that up to August, 1945, approximately 6000 men between the ages of 18 and 38 had been registered in Orange County. Of these, 1460 were rejected, and of the rejections, 622 (or 42.3 per cent) were for some sort of mental impairment. Fifty-seven per cent (357 cases) of all rejections on a mental basis were for mental subnormality.

Other data have been compiled on 336 individuals between 18 and 38, exclusive of the Selective Service rejectees. Of this number there are 233 definitely classifiable as mental defectives, 88 as mentally diseased and 15 who have been sterilized because of physical defects. Thirty-three others out of the total 336 have been sterilized under authority of the Eugenics Board.

Of 2900 elementary school children thus far tested, 439 (slightly more than 15 per cent) were found to have an intelligence quotient below 70.

These findings emphasize the immensity of the problem of mental defectives, who tend to have large families, several members within a family often being affected, and usually have a low economic status and poor physical health. The incidence of court cases and of dependence upon public relief in this group is high. The proportion of mental defectives is higher among rural than among urban dwellers, and higher among Negroes than among the white population.

Almost all cases coming to the attention of the State Eugenics Board are by consent of the patient or next of kin. It has been the experience of several public welfare workers that a considerable number of mental defectives and their close kinsmen would be favorable to the idea of sterilization if they understood the medical implications. Practitioners of medicine are certainly in a much better position than welfare workers to provide an acceptable explanation.

In spite of the findings of this study, the Eugenics Board has no intention of advocating a wholesale program of sterilization. However, much may be accomplished by greater enlightenment of the public, and by the increased use of the existing channels for sterilization.

THE SUPERIORITY OF THE SOUTH AFRICAN NEGRO OR  
BANTU AS A PARTURIENT. PARTS I AND II

O. S. HEYNS

J. Obst. &amp; Gynaec. Brit. Emp., 53: 405-429, 1946

In order to assess the size of the head of the Bantu newborn, measurement was carried out on 500 heads, and from the results it is concluded that the difference between Bantu and European fetal heads at term is not considerable. While there is great variability between the Bantu and certain European figures, many of the latter are smaller than the Bantu averages. Evidence has not been found to prove that the Bantu newborn has a smaller head than the European at birth.

It is great value for the obstetrician to observe the relationship existing between fetal weight and the size of the fetal head. The general impression is that a relatively large fetus has a relatively large head; and if disproportion is being estimated, the size of the fetus as judged by palpation is recognized to be an important factor. This view is sound in many cases, but the correlation tables for birth-weight and fetal skull diameters show that a small fetus may have an unexpectedly large head and thus be responsible for serious obstetrical errors. Conversely, but with less danger, unnecessarily radical treatment may be adopted because a fetus which is estimated to be large has a relatively small head.

In the tables presented in this paper, only birth-weights are considered, and the size of the head is based on the areas of cross-sections of the head in 2 different planes. From these tables it may be observed that 15 babies weighed under 6 lb. and still had the greater area between 75 and 80 sq. cm., the mean for this area being 80.64 sq. cm. Similarly, 11 babies weighed under 6 lb. and had a lesser area of 65 to 70 sq. cm., the mean for this area being 68.64 sq. cm. Conversely, there were 17 babies weighing over 8 lb. which had the greater area below the average, and 11 babies weighing over 8 lb. had the lesser area below 65 sq. cm. One baby weighing 10 to 11 lb. had a "greater head area" which was equal to the mean. Two babies weighing only 4 to 5 lb. had the "lesser head area" greater than the mean. Babies weighing 9 lb. showed a range of the lesser area between 60 and 85 sq. cm., and a range of the greater area between 75 and 100 sq. cm. A range of the same order was seen to occur for most of the other weight groups.

The conclusion drawn from the correlation tables is that at term there is a well marked relationship between fetal weight and the size of the fetal head. However, there are important exceptions, in which a small baby may have a large head and vice versa. These exceptional cases are of importance to the clinician. When the obstetrician assesses fetal proportions in a case of disproportion, he must be armed with the knowledge that head and body size may not be proportional.

Having thus shown that in 500 Bantu newborn the mean area of the fully flexed head was 68.64 sq. cm., an attempt was made to assess the pelvic capacity of the Bantu parturient. X-ray pelvimetry was carried out on 103 primigravidae and on 25 cases of postnatal vesico-vaginal fistula. Parturition was assessed on the basis of the areas of the planes of the brim, cavity and outlet of the pelvis. The fistula cases did not provide as much information as was expected concerning the level of pelvic contraction below which spontaneous delivery becomes improbable. This was due to the fact that bladder trauma was sustained in the absence of a trained observer, and dystocia may have been due to factors other than small pelvis.

In the series of 103 primigravidae there were 14 pelves that had a plane area below 80 sq. cm., and 24 pelves with areas 80 to 90 sq. cm. As stated above, the greatest cross-section of the well flexed Bantu fetal head has an area of 68.64 sq. cm., and it seemed reasonable to suppose that a pelvic area of 80 sq. cm. would be required for passage of the well flexed head.

Twelve cases were sent to the hospital, but only 5 had instrumental deliveries: 3 cesarean sections and 2 forceps extractions. Of these 12 hospital cases, only 3 pelves had minimum areas below 80 sq. cm. Operative delivery was effected only in the hospital. Since a total of 14 pelves had plane areas below 80 sq. cm., 11 low area pelves were associated with spontaneous delivery.

There were instances of Bantu women delivering spontaneously with pelvic areas below 70 sq. cm. That this was possible is obviously due to moulding of the fetal head. Such findings have led to the conclusion that the South African Negro as a parturient is greatly superior to the white woman. It is suggested that the difference lies in the powers (uterine and other muscular action) which are used to the full in the Negro, but which suffer partial inhibition in the white woman. The Bantu woman believes that death is the alternative to success in childbirth.

Of the 103 single pregnancies in primigravidae, 8 resulted in loss of the fetus. There were one abortion, 3 macerated fetuses, 2 stillbirths in hospital, and on district one stillbirth and one infantile death an hour after birth.

### THE SUPERIORITY OF THE SOUTH AFRICAN NEGRO OR BANTU AS A PARTURIENT. PART III

O. S. HEYNS AND S. SHIPPEL

J. Obst. & Gynaec. Brit. Emp., 53: 519-526, 1946

An analysis has been made of 1433 Bantu and 5059 European antenatal patients seen over a period of 5 years.

The European primigravid incidence is about 6 per cent higher than that of the Bantu; therefore, there is a slightly greater possibility of dystocia in the

European than in the Bantu. There was a highly significant difference (12.77 times its standard error) for operative delivery in the 2 series, showing that the European requires assistance at delivery more often than the Bantu.

Maternal and fetal mortality were low in both series. The maternal mortality in the European group was 0.119 per cent, and in the Bantu group 0.1394 per cent. The stillbirth-rates for the European and Bantu series were, respectively, 1.910 per cent and 3.505 per cent. The neonatal mortality rates were, respectively, 0.74 per cent and 0.86 per cent.

From these findings it must be concluded that the Bantu parturient, under home conditions, exhibits considerable superiority over the European. It is the writers' impression that in hospital the Bantu is a less efficient parturient than the European woman.

## THE INFLUENCE OF X-RAY MEASUREMENTS ON THE PELVIC BRIM INDEX

O. S. HEYNS

Brit. J. Radiol., 20: 31-33, 1947

Twenty Bantu dry pelves forming a random sample of a larger series with mean brim index  $90.35 \pm 1.0$  were x-rayed. The mean index of the 20 pelves was 91.51. However, the mean index for these 20 pelves as calculated from radiographic data was 98.60. It was shown that the random sample allows valid conclusions to be drawn, because its distribution over the Caldwell and Moloy parent types of pelvis is similar to that in a larger series.

The plus error for the x-ray index is due mainly to the fact that its denominator must always be decreased, because the rim of bone shown on the film in the iliac region of the inlet always lies medial to the true iliopectineal line (Heyns, 1945). In assessing the value of precision of a mean index found for a series such as that of Greulich and Thoms (1939), the statistical method is inadequate even when bearing in mind these facts concerning radiographic error. A solution has been found in an analysis of the data derived from study of the 20 Bantu dry pelves. Greulich and Thoms' work deals with 2 series: 582 clinic women and 104 student nurses. The former group gave a mean index of about 90, the latter a mean of well over 95. An analysis of the author's experiment is presented in this report, and from it the deduction is valid that, whereas Greulich and Thoms' student nurses show a mean radiographic brim index in the vicinity of Heyn's experimental figure of 98.6, it is probable that this figure should lie close to this writer's true value of 91.5.

It is submitted that the student nurses have on the average a low mesatipellic brim index as in the case of the South African Bantu and many other racial groups, and that the "clinic women" studied by Greulich and Thoms have an

index not much above 85. Racially, these 2 groups of women had different origins. Thus 63.9 per cent of the nurses were English, Irish, Scottish or Welsh as compared with 11.5 per cent of the clinic women who were predominately derived from Italian, Polish, Lithuanian and other Eastern European stocks. As pointed out, the author's interest lies not with the latter group which almost certainly has an unusually low index, but with the nurses who now appear to have a common mesatipellic (90 to 95) index. Greulich and Thoms have not published all their incidental values, and those referred to have been deduced from such data as were available.

The author submits, in conclusion, that there is no evidence that superior nutrition and living conditions will increase the incidence of Caldwell and Moloy's anthropoid type pelvis above 20 per cent in the adult.

## MISCELLANEOUS

### PRESENT TRENDS IN OBSTETRICS

S. A. COSGROVE

New England J. Med., 235: 811-815, 1946

The author discusses the significant trends in obstetric practice as pertaining to pain, hemorrhage, toxemia and sepsis.

*Pain.*—The analgesic agents, which are employed during the first stage of labor and a portion of the second stage, comprise the truly analgesic agents, such as morphine, and those that are merely amnesic. Agents of these 2 groups are frequently combined. Most venerable in length of use are opium and its derivatives, such as morphine and heroin. One of the most recent is Demerol, a synthetic preparation quite like morphine pharmacologically. The principal limiting danger of these drugs is the marked tendency of all of them to narcotize the fetus and to affect the establishment of normal respiration after birth. In these respects Demerol appears to be the least dangerous.

Another group of drugs having a powerful soporific action comprises the barbiturates. Evidence is accumulating that the most popular agents used a few years ago—the so-called “basal analgesics”, are far from innocuous, particularly in their effect on the fetus, but in the writer’s opinion they still have a distinct place in the resource of the obstetrician.

The usefulness of scopolamine depends wholly on its amnesic powers. Most practitioners prefer actually to abolish pain as far as possible, and use scopolamine as an adjuvant to other more definitely pain-relieving drugs.

The second group of pain-relieving agents, the anesthetic agents, is applied in the management of the terminal phase of the second stage of labor. These agents fall into 2 groups, the first of which includes those that act on the brain itself. They are administered by inhalation. Ether, oldest of them all, still retains an important place in the obstetric armamentarium. It may also be used as a labor analgesic, administered in oil by rectum. Chloroform, used soon after ether, served several generations of physicians well, but in the last quarter century it has lost this pre-eminence. It has been accused of a high maternal mortality rate and of dangerous toxic side-effects. The writer is not sure, however, that it deserves the total oblivion to which it has fallen.

Perhaps foremost in hospital use today for terminal inhalation anesthesia is nitrous oxide and oxygen. It is reasonably safe, but may be exceedingly dangerous in untrained hands.

All these agents which act centrally on the maternal brain also act centrally on the fetal brain, and therein lies a serious restriction of their usefulness.

The other available group of agents for termination of the second stage includes those which are applied only to the peripheral neuron of the mother’s

nervous system. In their entire innocuousness so far as the fetus is concerned, they present tremendous advantages. Novocain, by its relatively low toxicity, remains probably the standard for this type of anesthesia. In spinal or intrathecal anesthesia, a solution of the anesthetic agent is injected into the thecal sac surrounding the spinal cord at points below the termination of the cord itself. In caudal anesthesia, solutions of the anesthetic agent are injected into the spinal canal external to the thecal sac, through the hiatus of the sacrum. Other methods are parasacral injection and local infiltration.

These procedures have many advantages to the welfare of the mother, particularly when she is handicapped by certain intercurrent diseases. The author has employed spinal anesthesia for 20 years and believes that it constitutes an ideal method for vaginal delivery, in which it can be used in small enough dosage to eliminate the danger of sudden death and in which he has observed no other important unpleasant sequelae. His experience has been with the single injection method. In spite of the criticisms of spinal anesthesia, there is no doubt that it is being more and more widely used.

The first reports of caudal anesthesia were undoubtedly overenthusiastic. At the present time it appears that caudal anesthesia is not, in any but the most expert hands, properly applicable in more than one out of 4 or 5 patients or for a total period longer than 6 to 8 hours. Its most obvious dangers are inadvertent injection into the thecal sac or into the blood stream, and danger of infection of the meninges. Results in successful cases are most satisfactory, and the well qualified obstetrician should consider this resource at his command, but it is incapable of supplanting other methods in the majority of cases.

Infiltration anesthesia, with or without peripheral-nerve block, is the safest of all anesthetic methods, but it is not universally applicable, since neurotic patients are not favorable subjects.

*Hemorrhage.*—The reduction of the danger of hemorrhage, which is actually the most frequent purely obstetric cause of death, continues along lines long since laid down. They include the following: better training in exact and early recognition of ectopic gestation, placenta previa and abruption of the placenta; less reliance on packing of the uterus; more intelligent search for sources of bleeding in parturient canal and uterus; and application of more definitive operative therapy to several of these sources when demonstrated; increasing knowledge and appreciation of significance of Rh-factor incompatibility; and inclusion of blood-group and Rh-factor determination in routine prenatal care. A further vital step in combating hemorrhage is increasing provision and improvement in the operation of blood and plasma banks. It is probably wise to use vitamin K in post-partum uterine inertia or in infants suspected of suffering from actual potential hemorrhage, but it is only a possible useful drug, not a miraculous substitute for other time-tried methods.

*Toxemia.*—Although it cannot be said that there has been any significant advance in knowledge of the pathogenesis of toxemia, in classification or methods of treatment, clearer concepts of the necessary treatment are emerging. The important factors in treatment are early recognition of toxemia by pre-



sumptive and slight clinical evidence, prompt institution of the fullest regime for control of the disease when discovered and definite—if necessary, radical—control of the time the disease is permitted to persist. Even occult edema suggested by exorbitant weight gain should be considered, and treatment begun at once. More definite indications, even of slight degree, require the fullest program of treatment, generally including hospitalization.

The only definitive treatment of toxemia is termination of pregnancy. Since the time of interrupting pregnancy is of utmost importance, radical means are often warranted in preference to less certain and protracted methods. Cesarean section is sometimes appropriate on this basis. After the thirty-fourth week it is not inimical to the baby's chances of survival. Eclampsia necessitates entire concentration on the medical treatment of the mother; the baby's interest must be subordinated to hers.

All that has been said about early recognition, prompt and adequate treatment and timely termination of pregnancy in toxemia applies with special emphasis in the hypertensive patient with superimposed toxemia.

*Sepsis.*—The availability of the sulfonamides and of several antibiotic agents has greatly increased the resources of the obstetrician in treating septic complications of pregnancy, labor and puerperium. *Streptomycin* appears to promise great value in certain infections not amenable to other antibiotics. However, these valuable agents must not be depended on to replace, or justify carelessness in, the surgical technics necessary in preventing sepsis. The increasing recognition of the value of small, repeated blood transfusions in treating infective complications is wholly constructive.

In conclusion, the writer discusses the increasing trend toward "rationalism" in obstetrics. Rationalism includes keeping the normal case normal and the principle that medical and surgical complications of pregnancy should be appropriately treated medically and surgically, without interference with pregnancy.

(As might be expected from Cosgrove, this is an intensely practical paper full of sane and well-tempered advice. To single out just one of the many points touched upon, he advocates in postpartum hemorrhage less reliance on packing the uterus. In an editorial note in the last issue of the Survey, the several virtues of bimanual compression of the uterus in postpartum hemorrhage were emphasized and attention directed to the fact that the British, like Cosgrove, have little confidence in uterine packing. Most obstetricians of experience can remember several instances in which patients have bled through one pack and probably a few cases in which they have bled through two or even three. From a theoretical viewpoint packing the uterus can control postpartum hemorrhage in only one way, that is by acting as a foreign body which is supposed to stimulate contraction. It cannot possibly act as a tamponade and exert compression effects because it is inconceivable that much compression can be exerted from one side only on an elastic bag such as the relaxed postpartum uterus. But this and other objections to packing the uterus in postpartum hemorrhage were clearly and emphatically reviewed by Cosgrove some ten years ago as follows:

"At about this juncture most authorities advise packing the uterus. This, I do not approve. It seems to me entirely unphysiological. Up to this time all effort has been made completely to empty the uterus in order to permit it to contract down, and by its contraction to squeeze shut the bleeding sinuses and permit their occlusion by clots formed

in the mouths thereof. Now, to reverse this physiological effort to empty the uterus, and proceed to introduce a large mass of foreign material with the avowed purpose of stimulating the uterus to contract and of controlling bleeding by direct pressure of the foreign mass against the sinuses, necessarily mechanically held wide open by the pressure of that mass, does not seem to me good sense.

"If the uterus is so truly atonic as not to be capable of response to the mechanical stimulation of manual control already described and powerfully acting oxytoxics, one can hardly expect that it will be capable of responding to the less efficient irritation of a wad of gauze pushed into it. If it does not so contract, it will merely balloon more and more as blood accumulates above the pack, and the supposed function of direct pressure of the packing against the whole surface of the uterus will be nullified. In this way the packing may do little more than stop the obvious flow of blood escaping from the uterus and lull the operator into a false sense of security.

"The best descriptions I have been able to find of the technic of packing insist on the necessity of the attendant's staying with the patient and exerting manual pressure of the fundus against the packing from above and the provision of counter-pressure against it from below by tight vaginal packing or manual manipulation.

"Thus, the packing cannot be depended upon to function without the constant presence of the attendant, and the use by him of manual manipulation applied directly to the uterus. It would therefore seem to me self-evident that his continued presence for the same length of time, and his manual manipulation applied to the uterus without the intervention of the packing, would be definitely more effective and physiological than with the use of the packing. Besides all this, packing of the uterus is one of the gravest invitations to infection." South. M. J., 29: 1219-1225, Dec., 1936—Ed.)

## OBSTETRICS AND GYNECOLOGY IN AMERICA. I. THE BEGINNINGS OF OBSTETRICS IN AMERICA

C. E. HEATON

North Carolina M. J., 8: 35-37, 1947

Obstetrics in colonial America was almost entirely in the hands of midwives. The wife of Samuel Fuller, a physician, was among the passengers of the *Mayflower* in 1620, and was the earliest practitioner in Massachusetts. During the seventeenth century great progress was being made in obstetrics in Europe by such men as Deventer, Mauriceau, Portal and De La Motte, but their work had little influence in frontier America. In 1675, a Captain Raynes of Maine was presented in court "for presuming to act the part of midwife", and he was fined 50 shillings. Zerobabal Endecott practiced midwifery at Salem, Massachusetts, and compiled a collection of medical receipts dated 1677.

Obstetrics made great progress in the eighteenth century. The first lying-in hospital was established in Great Britain in 1739, through the efforts of Sir Richard Manningham whose *Compendium Artis Obstetricariae* was published in 1739-40. A number of well trained doctors immigrated to America from abroad, and a fairly large group of young colonial students crossed the seas and came in contact with the best that was being taught at Leydon, London and Edinburgh.

One of the first colonial physicians to acquire a reputation in obstetrics was John Moultrie who began practice in 1733 in South Carolina. The first public lectures on otstetrics were given by Dr. William Shippen who, in 1792, held the combined chair of surgery, anatomy and obstetrics in the University of Pennsylvania. The first lying-in institution established was a private one in Philadelphia, started by Dr. Shippen. In New York a lying-in ward was established in 1799 in the Almshouse, out of which grew Bellevue Hospital.

The first successful cesarean section in America was performed by Dr. Jesse Bennett, a country practitioner in the Virginia backwoods. The patient was his own wife, and at operation he removed both ovaries to prevent future pregnancies. The operation was performed on January 14, 1794, and was first described in *The History of the Great Kanawha Valley*, published in 1891.

Several early operations for advanced extra-uterine pregnancy were reported in British periodicals by American surgeons. The first such report was by Dr. John Bard in 1762.

Even before 1800 puerperal infection was prevalent throughout the country, and puerperal fever was the subject of several graduation theses in 1789, 1795 and 1798.

At the end of the eighteenth century a new group of men began to appear upon the scene who had been well trained by important teachers of obstetrics in London and Edinburgh. In 1807 the first systematic treatise appeared—Bard's *A Compendium of the Theory and Practice of Midwifery*.

## LEAVES FROM A BIBLIOTHECA OBSTETRICA

M. PIERCE RUCKER

Bull. Hist. Med., 29: 177, 1946

This article presents a survey of the old obstetrical books in the Miller Library of the Richmond Academy of Medicine with comments on the historical significance of the volumes and their authors.

The item which has the greatest association interest, in the author's opinion, is Dr. Jesse Bennett's own copy of Hull's translation of Baudeloque's work on Caesarean section, a report of 31 successful cases. The importance of this volume lies in the fact that Dr. Bennett made a brief notation in its pages which indicates, on retrospect, that it was he who performed the first cesarean section done in the United States. The title page bears Jesse Bennett's signature and on page 71 after the 24th case, Bennett has written "25th 14 Jany. 1794 J. B. on E. B. up 9th Feby. Walked 15 Feby Cured on 1 March." This is all the record there is of the first abdominal delivery in the United States. When asked years later why he did not report the case, he replied: "No doctor with any feeling of delicacy would report an operation he had done on his own wife." Another time he said: "No strange doctors would believe that operation could be done in the Virginia backwoods and the mother live, and he'd be

damned if he would give them a chance to call him a liar." He evidently had definite opinions about the operation, what to do and what not to do, for a number of passages of his book are underscored. On page 72 he underlined



FIG. 1. DR. JESSE BENNETT, WHO PERFORMED THE FIRST CEASAREAN SECTION IN THE UNITED STATES IN 1794.

(Courtesy of Dr. Pierce M. Rucker)

*"the operation is not essentially mortal."* On page 73 he noted the following: *"if he had not introduced a catheter into the deepseated collection of matter which threatened the most dreadful consequences, Mr. Baqua, like many others, would have failed in attaining the end, which he proposed to himself, and would have*

furnished an additional arm to the adversaries to the caesarean operation, in making them acquainted with another victim. Vermond owed the preservation

( 71 )

21st and 22d. LAMERON, Surgeon at Orleans, has performed the same operation twice upon one woman<sup>(1)</sup>, who has since laboured very fortunately. She was operated upon the first time, on the 9th of August 1775; and the second time on the 30th of December 1779.

23d. DUMAY, Surgeon at Fontenai-le-Peuple, performed the same operation on account of a rupture of the uterus, although the fœtus had not penetrated into the belly, on the 4th of Germinal in the 4th Year, (23d March 1796) and on the 30th day the wound was not larger than a shilling<sup>(2)</sup>.

24th. Finally Mr. BACQUA has performed the cesarean operation more recently, namely on the 25th of Floreal in the 5th year, (14th May 1797) and has met with all the success, that could be desired from it<sup>(3)</sup>.

(1) The womb of this woman was lacerated in two successive labours and the infant, each time, passed completely into the cavity of the abdomen.

(2) This observation, highly interesting to the progress of the art, will be published at full length in the *Recueil*, when the further account of it, which has been requested, shall be received.

(3) See *Recueil Périodique*, pag. 434, tom. IV.

FIG. 2. PAGE 71 OF BENNETT'S OWN COPY OF HULL'S TRANSLATION OF BAUDELOQUE'S "MEMOIRS ON THE CAESARIAN OPERATION." As explained in the accompanying abstract, this is all the record there is of the first cesarean operation in the United States. (Courtesy of Dr. Pierce M. Rucker)

of the patient whom he delivered of two healthy children, entirely to his introducing a sonde de poitrine." Thus we see what Bennett thought of drainage when there was a collection of pus. However, in Mrs. Bennett's case, he closed

25<sup>th</sup> 14 Jan<sup>r</sup> 1797 J.P.S. on 9 Feb<sup>r</sup>  
 Walked 15 Feb<sup>r</sup>  
 Cured on 1 March

the abdomen without drainage. Before doing so he removed both ovaries, remarking as he did that he would not be subjected to such an ordeal again.

(In keeping with Rucker's other historical studies this paper is a delightful as well as an erudite contribution, describing with appropriate commentary the more important volumes of the rich *bibliotheca obstetrica* of the Richmond Academy of Medicine. Numerous items of importance in the original article have been omitted from the above abstract such as the author's extensive review of 16th century works; but these omissions seemed desirable in order to focus attention on Jesse Bennett and his cesarean section of 1794.

It has been customary to assign the first American cesarean section to a much later date than 1794. Thus many of us will recall in this connection the classical case—often stated to be the first abdominal delivery in this country—of the 14-year old mulatto girl who, becoming crazed by the agonizing pains of labor, slit open her own abdomen to put an end to her sufferings. A pair of twins was extracted from the uterus which died shortly afterward, but the girl herself made a good recovery. This occurred in 1822 in Nassau, New York, and was reported by Dr. Samuel McClellen (*New York Medical and Physical Journal*, 2, 40-44, 1823). In his well known *History of Medicine*, Garrison states that the first cesarean section in the United States was performed by Dr. John Lambert Richmond in Newton, Ohio, in April, 1827; but J. Whitridge Williams in his *Sketch of the History of Obstetrics* up to 1860, gives this credit to Dr. Francois Prevost of Donaldsonville, Louisiana, who performed the operation 4 times prior to 1832 with 3 successful cases.

It is quite apparent from the foregoing dates that Bennett's case preceded any of the above operations by more than a quarter of a century and has been overlooked simply because he did not report it. Blanton, in his *Medicine in Virginia in the 18th Century*, gives further interesting details about this operation. It appears that the Bennetts then lived in a frontier settlement in the Shenandoah Valley. Mrs. Bennett's labor was a difficult one due to a contracted pelvis, and Dr. Alexander Humphreys of Staunton, who was called in consultation, tried forceps without success. Between the alternatives of craniotomy and cesarean section the patient chose the latter in spite of the opposition of Dr. Humphreys and his persistent refusal to perform such a dangerous procedure. Hence Dr. Bennett decided to operate himself. The patient, stretched on a crude plank table over two barrels, was put under the influence of a large dose of opium. Assisted only by 2 negro women, the courageous frontier surgeon by one stroke of the knife delivered child and placenta. At this stage he delayed long enough to remove both ovaries. As one of the witnesses declared, "he spayed her," remarking as he did so, "this shall be the last one." The wounds were closed with stout linen thread, and contrary to the opinion of everyone present Mrs. Bennett was soon well and active. The child, a daughter, is said to have lived to be 77 years of age.—Ed.)

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# Maternal Mortality Reports

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*(Secretaries of Maternal Mortality Committees are invited to submit selected cases of maternal deaths, with analysis appended, for publication in this section of the Survey. Cases should be chosen on the basis of educational value, not because of rarity. For obvious reasons complete anonymity will be maintained.*

*Readers should note that the comment which follows each case history represents the opinion of the Committee concerned and does not necessarily reflect the attitude of the Editors.)*

## CASE NO. 36

The patient was a 24 year old white multipara with 3 living children, who first consulted her physician in the 7th month of her fourth pregnancy. Examination at that time revealed a normal blood pressure and negative urine. Blood was not taken for an STS, nor were pelvic measurements or vaginal examination carried out. Her EDC was September 23. The patient made an undetermined number of office visits during the next six weeks. Blood pressure and urine examination were said to have been within normal limits, though no exact records are available.

On the afternoon of September 16 the patient's husband came to the physician's office stating that his wife had a severe headache. The physician went to the patient's home and found her having convulsions and unconscious. He administered a sedative, and shortly thereafter left the house and returned to his office, instructing the patient's husband to call him again if he were needed. Approximately 3 hours later he received a call requesting that he return to see the patient, but due to travel difficulties was greatly delayed in making the trip. During this interval of time the patient delivered unattended and died unattended some 4 hours after delivery. There are no further details as to exact blood pressure readings or data concerning the exact amount of medication given.

*Comment:* Both the incidence of eclampsia and the mortality rate attending it have been materially reduced in the past two decades. These improved results have been brought about first of all by better prenatal care, and secondly by conservative but vigorous treatment of eclampsia itself. Such treatment can be given in hospitals only and will give eclamptic patients approximately 19 chances out of 20 of survival.

This patient lived and died within 14 miles of two well equipped hospitals with maternity sections.

## CASE NO. 37

The patient was a 42 year old white para 6 with 6 living children, whose EDC was November 18. She had made monthly prenatal visits since June, and no abnormalities were detected at any time during her prenatal course other than one isolated blood pressure reading of 140/80. The blood pressure usually ranged between 120/80 and 135/80; the urine remained free of albumin, and the pulse rate was usually found to be about 92. The patient fell into labor spontaneously on November 11, and was seen shortly thereafter in her home by the attending physician. He noted at that time that the patient was markedly dyspneic and that the lips were markedly cyanotic. As labor progressed both the dyspnea and

cyanosis increased, and the pulse rate became "rapid". Shortly before delivery the patient began to spit up bloody frothy material. After a short labor she delivered spontaneously a living infant, and the placenta was expressed intact. She was given coramine and pituitrin, but her condition went steadily downhill and she died in cardiac failure one hour following delivery.

*Comment:* Errors in judgment in obscure or borderline cases are perhaps excusable and are made occasionally by the most conscientious physicians. Errors based on failure to take time for complete histories and careful physical examinations are inexcusable. While it is possible that this patient developed some sudden rare cardiac complication, the chances are greatly in favor of pre-existing cardiac disease which could and should have been detected from the history or physical examination, or both. Many women with heart disease are carried safely through pregnancy each year, but only by careful evaluation of their cardiac status and by meticulous care. Many others, unfortunately, die each year from failure to inquire into their cardiac function. Pregnancy and labor impose a considerable burden which the normal heart can stand, but under which the damaged heart collapses. This death was therefore considered preventable on the basis of failure to detect existing heart disease, plus failure to do anything about it when it became obvious the patient was in cardiac failure.

#### CASE NO. 38

The patient was a 44 year old white multipara with 4 living children, whose EDC was February 15. She obtained regular prenatal care from the 4th month of her pregnancy, and complete examination and all findings during her prenatal course were negative. She fell into labor spontaneously on February 1, and was first seen by her physician in the hospital after 20 hours of mild, irregular, prodromal pains. At this time she was having moderate contractions every 5 minutes, and examination revealed the cervix to be undilated. During the succeeding 16 hours the patient continued to have indifferent irregular uterine contractions and there was no cervical dilatation. X-ray of the pelvis confirmed the clinical impression that there was no cephalo-pelvic disproportion. The patient was taken to the delivery room, and the cervix was partially manually dilated, and thereafter labor is stated to have progressed uneventfully with the spontaneous delivery of a living child approximately 7 hours later. At the time of delivery several large vulval varicosities ruptured, but bleeding from this source was minimal, and was controlled easily.

The placenta separated spontaneously and was expressed intact, but following delivery of the placenta there was moderately profuse vaginal bleeding. Hemorrhage was partially controlled by massage of the uterus but continued to be excessive. Accordingly an attempt was made to inspect the cervix, but due to inability to obtain sufficient exposure, this was abandoned. Vaginal bleeding continued, and the patient went into vascular collapse and died 6 hours after delivery.

Permission for autopsy was obtained. At autopsy a laceration of the cervix extending up into the lower uterine segment and into the large vessels was found.

*Comment:* Differentiation between true labor and so called false or prodromal labor is often difficult but is of vital importance. Nothing more frequently leads the unsuspecting obstetrician into a precarious position than mistaking false labor for real labor. In a patient with a normal pelvis and no abnormal mechanical factors, an undilated or undilating cervix is potent evidence that



the patient is not in labor. A safe general rule to follow is when in doubt consider the patient not in labor, administer morphine and sedatives, and await the subsequent onset of effective uterine contractions. Such a point of view in this case would have led to the quick realization that there was no indication for interference, least of all for interference such as manual dilation of the cervix, a procedure which has been generally discarded as having virtually no place in modern obstetrics.

#### CASE NO. 39

The patient was a 23 year old white primigravida whose EDC was July 19. Her prenatal course was completely uneventful except for a weight gain of 28 pounds, and complete physical examination, including pelvic measurements, was normal.

On July 13, the patient began to have slight vaginal spotting. She was visited at home and a rectal examination carried out which revealed the cervix closed. The patient was advised to remain in bed, and vaginal bleeding stopped after a few hours. Three days later, on July 16, she again had slight vaginal bleeding, and the membranes ruptured spontaneously. Four hours later labor began spontaneously, and she went to her physician's office. At this time the blood pressure was 120/69, pulse 80, hemoglobin 88 per cent, uterine contractions mild, and there were occasional small clots of blood escaping from the vagina. She was admitted to the hospital, and a sterile vaginal examination carried out, revealing a marginal placenta previa. Full dilatation was reached after 5½ hours, and after a second stage of 1½ hours, it was noted that her pulse rose abruptly from 80 to 160 per minute. Blood pressure at this time was 110/60. She was delivered by low forceps and episiotomy at 1:30 A.M. on July 17. Five minutes after delivery the patient was still in shock with the pulse rate of 160 per minute and blood pressure 40/0. She was placed in Trendelenburg position, heat was applied, and a clysis of normal saline and 5% glucose started. Intravenous fluids were not given, because of collapsed veins. At 2:15 A.M. the blood pressure was 80/20, and at 4:00 A.M. it had risen to 120/80, but the pulse rate remained 140 per minute. By this time the patient had regained consciousness. At 8:00 A.M. the blood pressure was down again to 80/10, and she was given 250 cc. of plasma intravenously. At 4:00 P.M. July 17, the patient appeared very pale and somewhat apprehensive, and a vaginal examination was carried out. No lacerations of the cervix were found. It was decided that it would be advisable to give the patient a small transfusion, but 20 minutes after this decision had been reached and before blood was given the patient went into even more profound shock and died 16 hours after delivery.

Permission for autopsy was not obtained, but aspiration of the peritoneal cavity yielded no bloody fluid.

*Comment:* The failure to make any attempts to give this patient a blood transfusion during the first 15½ hours of her postpartum course is unquestionably the major factor in the outcome. She presented a classical picture of shock due to excessive blood loss, and had been found to have a definite marginal placenta previa early in labor. The difficulty in accurately estimating blood loss is well known. Moderate continued hemorrhage over a prolonged period of time invariably produces a total blood loss far in excess of what one would estimate. This patient accordingly exemplifies an all too common sequence of events in postpartum hemorrhage, namely, the degree of hemorrhage and gravity of the situation are not appreciated until the patient's condition becomes hopeless.

## CASE NO. 40

The patient was a 16 year old white primigravida, whose EDC could not be determined, since conception had occurred before the patient had had a menstrual period. She was first seen by a physician on October 4, at which time she was considered to be approximately 30 weeks pregnant. Examination at that time revealed the fundus of the uterus one-half way between the umbilicus and xiphoid process. The patient weighed 128 pounds, blood pressure was 130/85, and the urine was free of albumin. She was next seen two weeks later, on October 18, at which time the weight was 130 pounds, the blood pressure not determined, and the urine was still free of albumin. She was asymptomatic. Her next prenatal visit was made two weeks later, on November 1, at which time her weight was 132 pounds, blood pressure 150/100, and the urine now contained a trace of albumin. The patient was sent home with instructions to go to bed, to take a salt poor diet and a saline cathartic, and to report back to the physician's office 3 days later. On the morning that the patient was due to make her next office visit, namely November 4, she awoke from her sleep at 2:00 A.M. complaining of severe headache. The physician was informed of this and instructed the patient to go immediately to the hospital, where she was seen in the accident room at 3:00 A.M. Her blood pressure at that time was 120/60, and catheterization yielded insufficient urine for examination. She was admitted to the hospital, and two hours later had a generalized convulsion. The blood pressure at this time was 130/80, and the urine showed a trace of albumin. She was then given morphine, intravenous magnesium sulphate and barbiturates. The details of her further treatment are not available, other than that magnesium sulphate and barbiturate therapy was continued. No attempt was made to induce labor, and the patient died undelivered 24 hours after her admission to the hospital.

*Comment:* The decision to treat this patient conservatively met with the approval of the committee, but it was felt that more vigorous sedation, plus the use of intravenous hypertonic glucose would have been helpful.

Eclampsia remains an extremely treacherous foe, particularly in the very youthful patient. Matters would be greatly simplified if one could draw a dividing line and say with assurance "Eclampsia will not develop if the blood pressure is below 140/90". Such is not the case, however, and several members of the committee recalled having seen typical eclampsia in youthful patients whose blood pressure never exceeded 130/80. On the grounds that the significance of the blood pressure of 150/100 and trace of albumin three days before admission in a patient of 16 years of age was largely overlooked, this was voted a preventable death.

## CASE NO. 41

This patient was a 35 year old colored para 6, with 1 living child. The exact details of her previous labors are unknown except that she had had difficult labors with 5 children being either stillborn, or dying shortly after delivery. The details of her prenatal course in the current pregnancy are also unknown, but the patient was admitted to the hospital on February 24, with a history of having been in labor at home for 36 hours. Her attending physician had attempted forceps delivery unsuccessfully in the home some 3 hours prior to her admission.

Examination upon admission to the hospital revealed an obese colored female with a large infant in the R.O.P. position. The fetal heart could not be heard, and on rectal examination the cervix was fully dilated with the head 3 finger breadths below the spines. The temperature was 99.4°, and there was a foul odor to the vaginal discharge. Immediate

treatment consisted of the application of a tight abdominal binder and the administration of 1000 cc. of 5 per cent glucose intravenously. Seven hours after her admission to the hospital, during which time the patient had had no uterine contractions, a sterile vaginal examination was carried out which confirmed the findings of the previous rectal examination. Under gas-oxygen-ether anesthesia an attempt was made to carry out forceps rotation of the head from R.O.P. to direct occiput anterior. This could not be accomplished, nor could the head be delivered by forceps as an occiput posterior. Forceps delivery was accordingly abandoned, and a decision was made to carry out internal version and extraction. Upon attempting this procedure a tight contraction ring was found around the baby's neck. 6 mm. of adrenalin were given and the ether anesthesia deepened, but in spite of this there was no relaxation of the contraction ring. The patient's general condition by this time was so poor that further attempts to deliver the patient at this time were abandoned, and it was decided to wait until the following day to carry out abdominal delivery followed by hysterectomy. Her condition, however, went steadily downhill, and the patient died undelivered in collapse at 5:20 P.M. February 25, twenty-nine hours after her admission to the hospital and sixty-five hours after the onset of labor.

*Comment:* Some obstetrical calamities develop with complete suddenness and unexpectedness. In others the warning signs are there for all to see. What could be much more urgent warning than the history of the loss of five infants out of six from dystocia? Certainly this woman deserved careful study, particularly of her pelvis, before tempting fate again in allowing vaginal delivery.

Following this initial costly error which resulted in the death of the infant, the committee felt that the advisability of performing a destructive operation on the dead infant was overlooked. With better preparation for delivery in the nature of plasma and blood, this patient would probably have withstood craniotomy and cleidotomy. Such procedures are not nearly so shocking to the mother as repeated attempts at forceps delivery or version and extraction.

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# Gynecology

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## THE TREATMENT OF CERTAIN CONGENITAL MALFORMATIONS OF THE FEMALE GENITO-URINARY ORGANS

*A Resumé of Recent Progress*

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Until fairly recently, most patients with congenital malformations were necessarily considered as unfortunates who were beyond medical relief. There have been, of course, notable exceptions to this statement, for in all branches of medicine, there are specific congenital anomalies that have been corrected with varying success, for many years. The treatment of hare-lip has, for example, long been a fairly standardized procedure. In gynecology and female urology, physicians have been forced to try to correct certain malformations, because they make life unendurable. This applies to the correction of exstrophy of the bladder, imperforate hymen, certain types of urinary and rectal incontinence due to ectopic opening of the ureters or anus, anal atresia and other similar conditions. The treatment of some of these conditions involved surgical procedures that were relatively simple and successful, such as incision of an imperforate hymen or anus, or removal of a rudimentary kidney that had an ectopic ureteral orifice. Other procedures were more formidable, such as implantation of the ureters into the intestine for the correction of exstrophy of the bladder. Some of these procedures entailed so much risk that they were deferred as long as possible, often far past the optimum time for their performance; and then they were done with great reluctance.

Within the past decade or two, this situation has changed and is still changing. Malformations which were formerly considered hopeless are now being corrected routinely in many hospitals. Operative procedures which were once almost prohibitive have been so simplified that they are being performed by surgeons everywhere. Safeguards have been introduced which tend to prevent or control such complications as hemorrhage, infection or accidents which used to nullify the results of treatment.

Such progress marks every branch of surgery. In the correction of vascular malformations, the contributions of surgeons such as Blalock, Elkin, and others have been built on the investigations and technique which were developed by

Halsted, Matas and others. The recent World War gave an impetus not only to this but to all branches of plastic surgery. And the application of these basic principles has made possible the recent achievements not only in civilian but also in military surgery.

Although the accomplishments of surgery may be more spectacular, they find a parallel in the changed attitude toward the medical problems that are involved. For every person with a significant anomaly has not only a physical, but also a psychic battle to win. In this battle, the physician can be of great help or hindrance. The former helpless attitude was well expressed by a well known psychiatrist who told the parent of an unfortunate child to "put it away in an institution and forget it". That is undoubtedly the easiest thing to do, and is essentially the way savage tribes still handle the problem. But such a policy would never have put us where we are today in our ability to ameliorate or correct many of these faults.

This progress has been made possible by investigation in many fields of medicine. Basically, it is founded on knowledge of embryology and anatomy, attained through the study of embryos and anatomical dissections. In the light of modern knowledge, an anomaly is no longer a confused mass of malformed organs, but can be explained on an embryologic basis and traced back to certain definite stages in fetal development. Such knowledge also emphasizes the consanguinity of many organs, their intimate embryologic interrelationship and explains how faults in the one system such as the Muellerian ducts are often accompanied by defects in embryologically associated structures such as the kidneys, bladder and large intestine.

Such important embryological information might well have remained buried indefinitely in dusty laboratories were it not for the common interest in progress that binds together all inquisitive members of the medical profession.

The study of malformations has also been advanced by the development of diagnostic methods in genito-urinary diseases. Urography, especially of the intravenous type, has made it possible to detect malformations in a very simple and accurate manner, without hospitalization. Progress in endocrinology has shed light on problems that have to do with the determination of sex and the maintenance of the normal sex balance. These have a distinct bearing on hermaphroditism. Developments in surgical technique have simplified procedures that were formerly too risky for general acceptance and have devised new operations for conditions that formerly were left untreated. The recent contributions to chemotherapy and antibiotics have also greatly lessened the dangers that formerly constituted the chief risk in certain procedures like the repair of intestinal malformations and uretero-intestinal anastomosis.

In the following pages, we shall outline the problems presented by a few of the common deformities of the female genito-urinary organs. We shall not attempt to cover the whole field, nor shall we describe the details of operative procedures. We shall discuss only a few of the commoner and more significant abnormalities and the general principles involved in their treatment.

## THE TREATMENT OF HERMAPHRODITISM

The chief problem in the life of the hermaphrodite is to conceal his or her physical defects so that he or she may live in moderate happiness and be accepted as a normal human being. If this cannot be done, nothing else is very worth while.

It is in the solution of this problem that the physician finds his usefulness. And in this, our best efforts usually result in the acceptance of a compromise. It is generally impossible to correct the physical faults of the hermaphrodite completely; one cannot replace her confused and rudimentary sexual organs by a new reproductive apparatus, as a mechanic can put a new motor in an old car. But the appreciative physician can be of great help in eliminating features that tend to betray the distressing sexual confusion; he often finds the opportunity to develop or form organs that make the person more nearly normal and acceptable. Furthermore, in the light of past experience and knowledge, he now realizes anatomical and physiologic limitations of therapy and therefore may advise against courses that might be unfortunate. Psychologically, also, he may be encouraging to the unfortunate individual in her effort to maintain a useful place in society.

*Social and Psychic Problems.* These are constantly in the mind of the hermaphrodite. Compared with them, most of us have no problems whatever. The hermaphrodite knows she is sexually abnormal and will never be able to lead a normal sex life. Whether she has been reared as a male or female, she knows that her ability to make a living and meet people professionally and socially depends entirely upon her success in concealing the fact that she is a "freak".

The success that some hermaphrodites have achieved is a credit to their native ingenuity, their skill in camouflage and the help and encouragement they may have received from their physicians. One of the author's patients, for example, although really a male pseudohermaphrodite without any trace of ovarian tissue, has overcome these social and biological handicaps so well that "she" is now an expert in hospital planning and was recently sent to this country to study American hospitals. Even in a completely nude state in an operating room, the true sex of this person was not suspected by nurses and internes, and when "she" is fully and expensively clad, she presents a very attractive appearance. And yet even this person must be constantly on guard lest facial hypertrichosis, her low voice, general male contour and muscular development, rather large hands, arms and neck, might not betray her true status. If such a thing might happen it might well terminate her career. This person knows she is really a male, masquerading as a female, and that nothing can be done to alter that situation.

One might also recall the instances of male pseudohermaphrodites who are following successful careers as nurses and teachers. They also know their sexual status. Unfortunately, not all hermaphrodites are that clever. Some are like the common clay of which most human beings are made and exert no effort to improve their status. Others, perhaps, may have had more ambition at one time but were discouraged by some unfortunate incident or advice; while

a certain number take advantage of their deformities and capitalize and advertise them in the side-shows of circuses.

In helping the ambitious hermaphrodite to overcome her handicaps, the physician has a constant responsibility and opportunity. His responsibility begins when the hermaphrodite is born and when he must decide its sex. Mistakes are often made then. At times, in later life, he may be asked whether it is advisable to alter the adopted sex of a hermaphrodite whose sex has been wrongly diagnosed. In general, it is extremely doubtful whether it is ever wise to change the sex of an individual. It is conceivable that in infancy one might make such a radical change without dire results, but it is far more likely that in this small world, there would always be someone with a long memory and a loose tongue to recall the sexual confusion in later years. The whispering rumor of such an incident might be an insuperable blow to a person who might otherwise successfully conceal her misfortune and lead a fairly normal life.

All successful hermaphrodites make skilful use of such camouflage as depilatories, paint, cosmetics, artificial busts, gloves to cover hypertrichotic arms and hands and attractive clothes to increase femininity. Surgical aid is often sought in eliminating masculine features such as an elongated clitoris, removal of a testicle from a labial sac and placing it into the abdominal cavity, or forming a functioning vagina. Most of these plastic procedures are indicated, if they contribute to the peace of mind of the hermaphrodite and make her life easier.

Recently, estrogens have been used by some hermaphrodites to increase femininity. One of the author's patients took five milligrams of stilbestrol daily for months to increase the size of her breasts. Even though this individual was a male and had no trace of ovarian tissue, this treatment did enlarge the breasts slightly, but not enough to justify the effort. Also, the breasts resumed their former state when the estrogen was stopped.

One hermaphrodite, a male who had been reared as a female and who had succeeded in making herself extremely attractive to men, once raised the question whether it was morally right for "her" to have sexual intercourse with men, knowing that "she" herself was really masculine. Such questions must frequently cross the minds of intelligent hermaphrodites.

#### TREATMENT OF FAULTS DUE TO AGENESIS

Among generic anomalies of the genito-urinary organs, one finds ectopic kidney, solitary kidney, agenesis of follicular epithelium of the ovary and their associated malformations. Less commonly seen are absence of the Muellerian ducts, ovary, endometrium or cervix. Absence of the uterus and vagina is probably one of the commonest of all gynecological malformations; this, however, seems to be due usually to an inhibition in the development of the Muellerian ducts rather than to true agenesis. It is, therefore, considered under the heading of Developmental Defects.

Genetic faults may be marked by complete absence of organs, absence of part of an organ, or rudimentary condition of an organ. In some instances, the genetic nature of the fault is clear, as, for example, when a kidney is completely

absent or when the germinal epithelium of the ovary is lacking. Such lesions are almost certainly due to some primordial error, and this supposition is strengthened when they are accompanied by other similar defects in organs that are related embryologically.

In defects marked by complete agenesis of an organ, it is impossible to replace the missing structure. Thus, no one has yet successfully transplanted a kidney from one individual to another, although in animals the kidney has been transplanted from one location to another in the same subject. And this has been done, apparently, without any impairment of function. The transplantation of skin and bone from one place to another in the same individual is one of the basic procedures in plastic reconstructive surgery.

But when one attempts to transplant organs from one individual to another in man and higher animals, he immediately encounters a formidable obstacle in the specificity of tissues. In lower animals, such specificity is not so marked. Thus, one of the classic experiments in genetics, performed successfully thirty years ago and repeated since, consisted in the transplantation of the ovaries from white rabbits into spayed female black rabbits. The ovarian grafts took and functioned, and the black rabbit host gave birth to litters of rabbits which were always white, proving that the characteristics of the offspring are determined by the chromosome content of the ovum and not by its nutritional environment. In these experiments, the black rabbit was only the host for the ovary of the white rabbit, and was no more the genetic mother of the white offspring than the incubator is the mother of the chicks that are hatched in it.

Even in such instances in which the grafting of organs has been successful, it is not certain how long such grafted organs live and function normally.

More recent examples of the transplantation of tissues and organs are found in the transplantation of normal endometrium into the anterior chamber of the eye in *macacus rhesus*, the transplanting of tumor cells into similar locations and the transplanting of parts of the cornea from one human being into another.

Transplanted endometrium lives many months or even years, and behaves just as does endometrium in the uterine cavity. It responds to stimulation by estrogens and progestin and goes through the cyclic phases of menstruation; such grafts have furnished us much information concerning the anatomy and physiology of menstruation. Likewise tumor cells proliferate in the anterior chamber of the eye. One of the most striking examples of tissue transplantation is the grafting of part of the cornea in human beings,—a procedure that restores sight. Since this operation has been used for only a few years, it is impossible to tell whether such grafts live indefinitely or not.

Achievements such as this indicate the possibilities that lie in tissue transplantation. If it ever becomes possible in human beings to transplant essential parts of the reproductive organs, the implications may well be far-reaching.

But even though it is not yet possible to correct genetic faults of the genito-urinary organs by replacing the faulty or absent organs, recent contributions to knowledge have served certain definite purposes. They have clarified our knowledge concerning these deformities, have revealed the limitations of therapy and have prevented much unwise therapy and surgery.



*Genetic Faults of the Kidneys*

This is true particularly in the consideration of two rather common genetic faults, anomalies of the kidneys and ovarian follicular agenesis. By means of embryologic, anatomic and clinical studies, we have learned something about the clinical syndrome of renal dystrophy and agenesis. It has been found so frequently in connection with other defects in the reproductive system, that it is now axiomatic that a complete study of the entire genito-urinary system is indicated in any such anomaly. In carrying out such studies, the intravenous urogram has been of more value than any other simple procedure.

Neglect of this safeguard is evident in the needless exploratory operations that are done, to determine the nature of obscure tumors that are ectopic kidneys. At times, these are solitary kidneys. Lowsley and Kirwin quote Thomson-Walker who collected from the literature 18 instances in which solitary kidneys were removed surgically, with the invariable death of the patient from uremia. Such disasters should usually be avoidable by adequate diagnostic study and appreciation of the characteristics of these anomalies. The author recently reported a group of six cases of congenital malformations of the Mullerian ducts, all of which were accompanied by anomalies of the kidneys. It is not yet possible to state exactly how frequently these anomalies are associated with each other; the association is sufficiently common, however, to justify the advice that in every instance of congenital malformation of any genito-urinary organ, the whole system should be carefully examined.

*Ovarian Follicular Agenesis*

A more recent contribution to our knowledge has been the work concerning ovarian follicular agenesis. Anatomically, this condition is characterized by absence of the follicular epithelium of the ovary. The germ cells are not there. The ovary consists only of connective tissue stroma with the usual blood vessels and nerves. Grossly, such an ovary is rudimentary, consisting only of a long strand of white fibrous tissue, at times not more than 4 or 5 mm. in thickness, in the usual situation of the ovary.

The expected effect of absence of follicular stimulation is evident in such persons. The breasts, uterus, fallopian tubes and vagina are rudimentary or undeveloped, since their growth depends upon estrogenic stimulation. Likewise, women with such lesions never menstruate.

Wilkins, Fleischmann, Albright and others have described this congenital syndrome. Its genetic nature is attested by its frequent association with other developmental defects, short stature, coarctation of the aorta, mental retardation and other anomalies. It is striking that this particular anomaly of the reproductive organs should be accompanied by this particular group of defects.

Unfortunately, there is yet no cure for this condition. Wilkins has given large amounts of ovarian hormones in the hope that ovarian development might be started. But, except for the temporary stimulation of the breasts, uterus and other genital organs, no benefit has been derived. Such temporary results of estrogen therapy, including genital bleeding, disappear after cessation of treatment.

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Muellerian ducts. The fallopian tubes are present, at times well developed, occasionally rudimentary, with absent fimbria and imperfectly formed lumen. The median ends of the fallopian tubes are not united but are separated from each other by 3 to 5 cm. The median ends often terminate in small muscular bulbs, as large as the seed of an olive or larger. These bulbs are diminutive, rudimentary uteri; in one such bulb, the author found a tiny uterine cavity about 4 mm. in diameter, lined by normal endometrium showing a progestational reaction. This tiny uterus menstruated every month; apparently; since there was no external escape for the menstrual blood, it was forced back into the fallopian tube where it formed a hematosalpinx. This was a classic case of cryptomenorrhea.

Just as there is no formed uterus, there is also no vagina. The external genitalia are normal, but above the hymen and vestibule, there is no space whatever. Hence, these women never menstruate externally at all. They are permanently sterile. Coitus is impossible and these are the complaints for which they seek medical advice.

*Treatment.* So far, there is no treatment for *absence of the uterus*, because no one has yet transplanted a uterus from one person to another. Also, the fusion of these separated ducts and their formation into a uterus has never been done surgically.

Until recent years, almost the same situation applied to the treatment of absence of the vagina. Sporadically, efforts had been made to construct the vagina, the earliest probably being the use of pressure by means of forms. This was first done more than 100 years ago. Interestingly enough, this method of forming the vagina is still useful, and, in many instances, successful. If the tissues between the bladder and rectum are pliable and soft, a vagina 5 or 6 cm. deep may often be formed in this way, by persistent pressure exerted daily by glass or pyrex tubes of increasing size. A vagina thus formed might probably have less tendency to contract because of scar tissue than one that had been dissected surgically. In this connection, it is to be remembered that even the natural and normal vagina tends to become smaller and contract if the person does not have coitus. This becomes particularly marked after the menopause, with the cessation of ovarian stimulation. Likewise, in these patients with absence of the vagina, there is frequently diminished or complete lack of ovarian stimulation, because some of these persons are male pseudohermaphrodites and in others, oophorectomy has been done for various reasons.

Of all the older surgical methods for construction of the vagina, the Baldwin procedure is probably the only one that is still being used. Described by Baldwin in 1904, this method utilizes the ileum to line the vaginal space. This method often produces a satisfactory vagina and was used extensively until simpler methods were devised. The disadvantage of this operation is its magnitude, because, in addition to the dissection of the vaginal space, one must also do an abdominal operation, resect the necessary amount of small intestine, do an intestinal anastomosis and suture the resected intestine into the vaginal space to line the walls of the future vagina.

The discovery and description of this syndrome has, however, been of decided benefit in isolating from the heterogeneous mass of cases of "ovarian failure", this group marked by agenesis of the follicular epithelium. Heretofore, practically all cases of ovarian failure had been attributed to some fault in gonadotropic stimulation, due to an imbalance or disorder in the pituitary, thyroid or some other endocrine glands. Hence, in such cases, the proper therapy seemed to be to administer gonadotropic hormones in the hope that the proper ovarian stimulation might be given, and awaken normal ovarian activity. This theory still is held to be correct, even though it is rarely possible to find the correct gonadotropic formula to solve the problem.

But the discovery that in some cases of ovarian failure, the fault resides in the ovary, immediately removes this group from this general class, and proves that in these cases, at least, the use of gonadotropic hormone is futile.

#### TREATMENT OF DEFECTS DUE TO ARRESTED DEVELOPMENT

##### *Absence of the Uterus and Vagina*

*Clinical Features.* This group of anomalies is generally characterized by the presence of the structures that should form the uterus and vagina; in other words, the Muellerian ducts are present, because the fallopian tubes are in their usual situations in varying degrees of development. Hence, in most instances, the fault is not due to complete agenesis.

In this group the developmental fault is complete non-union of the Muellerian ducts; these cases present a condition that was normal in an early embryo. The fault seems to lie in the fact that development was arrested at that early stage.

The basic condition which stopped the normal development of these organs is unknown. Numerous theories have been presented. Of these, the most reasonable seems to be the persistence of the urorectal septum, for unless the urorectal septum disappears completely, it acts as a wall that separates the lower ends of the Muellerian ducts. Embryologists, however, are non-committal in their views; this is a problem that remains to be solved.

In some instances, there is evidence of a genetic fault. The author recently assembled a group of cases of defective development of the Muellerian ducts, all of which presented associated anomalies such as absence of one kidney, ectopic kidney, crossed ectopy of the kidney, double kidney, horseshoe kidney, vulvo-vaginal anus, exstrophy of the bladder and other faults. Muellerian duct anomalies are also common in hermaphroditism. The problem of the basic etiology is, therefore, unsolved, and several factors may be involved.

Clinically, these cases of absence of the uterus and vagina usually present a characteristic syndrome. Eliminating the few that are a part of general malformation and hermaphroditism, women with developmental defects of the Muellerian ducts (absence of uterus and vagina) are usually quite normal otherwise. Some of them are unusually attractive. Their secondary sex characteristics, breasts, female contour, voice and external genitalia are normal. The ovaries are usually normal. At times, there are anomalies in the urinary organs, such as we have noted. The genital lesion is usually limited to the

The patient may injure the skin grafts or epithelium by untimely coitus. These and other complications have arisen after the patient has left the hospital, and any one of them may completely ruin the result if it is not promptly and properly handled. The importance of painstaking and interested care is, therefore, evident, if success is to be attained in this plastic procedure.

#### SUMMARY

Contemporaneously with recent contributions to embryology and normal development, the study of congenital malformations has progressed. This has opened up new methods for treating congenital deformities. It is rarely possible to correct a deformity so that the result is a completely normal organ. But is often possible to so construct an organ that functionally it is just as useful and satisfactory as the normal structure.

Also the study of congenital malformations has increased our knowledge of the limitations of treatment, and warned us of the possible presence of associated deformities that might be of grave importance if they are not discovered and understood.

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Even more radical were the procedures named after Popov and Schubert, which used large intestine in place of ileum.

Other types of operation used the tissues of the external genitalia or skin from the thighs to line the vagina. In the Graves operation, the labia minora were split and turned inward to line the dissected space. In the Frank-Geist procedure, the vaginal walls were lined by a tubular graft of skin dissected from the thigh by a complicated set of plastic operations. The Graves procedure is still used at times, and may be successful. It is applicable, however, only when the labia minora are large enough to form satisfactory flaps.

*The author's operation.* In 1928, the author successfully constructed a vagina merely by dissecting out a large space between the rectum and bladder and keeping this space open by a vaginal form until the epithelium from the vestibule had had a chance to cover the walls of the vagina. This procedure was published ten years later in 1938. If this procedure were uniformly satisfactory, there would be no need of any other. Unfortunately, it may take two or three months for the vagina to be completely lined by squamous epithelium; in fact, occasionally, the vertex of the vagina may remain uncovered by epithelium indefinitely. Consequently, the original procedure was quickly modified by the author and others, in that Thiersch grafts were placed over the form, to line the vaginal walls immediately and prevent the formation of granulation tissue and scar, and lessen the chance of subsequent contraction of the vagina. This technic has been described by the author, as well as others, in recent articles. It seems wise to use skin grafts to line the vagina, for the reasons that have been given; the author has used them routinely for years. At the same time, it is worth remembering that satisfactory vaginas have been made by many different surgeons, using the original technic without skin grafts.

The success of the operation depends upon various factors, the maintenance of normal caliber of the vagina, the absence of irritation, pain or discharge and the health of the epithelium that lines the vagina.

In former articles, the author has discussed various technical problems, difficulties and complications that may arise during the operation or the immediate convalescence. Hence, they will only be mentioned here, the need of dissecting an adequate space, the avoidance of injury to the bladder or rectum, hemostasis, infection, the care of the bladder during the convalescence, the possibilities of rectal injury due to forms that are either too large or too small, and other problems that may arise unexpectedly at one time. Upon the proper management of these problems and the care that is given to every small detail will depend the ultimate success of the operation. At times, during the convalescence, or weeks later, some complication will unexpectedly arise which threatens to ruin the result completely. Because of a minor local external irritation, a nervous patient may refuse to have coitus, discard the vaginal form and stop using it to dilate the vagina; painful granulations may arise in a spot not completely covered by the skin grafts; the vaginal orifice may contract, making it impossible to insert the form or have coitus. In one instance, a small form was actually pushed into the rectum by the patient several weeks after she left the hospital.

THE WEANLING GUINEA PIG AS TEST OBJECT  
FOR ESTROGEN ASSAYS

C. G. HARTMAN, L. J. LITRELL AND J. TOM

Endocrinology, 39: 120-130, 1946

A method of assaying estrogen by hypodermic injection of the vulvar region of weanling guinea pigs is described in this paper. This method depends upon the opening of the vagina in the immature rodent. While the immature rat and mouse provide suitable test material, the writers felt that, because of certain peculiarities of the guinea pig, this species might prove superior for the test. The closure membrane of the guinea pig vagina disappears with heat, to be regenerated after 4 days and to remain intact for the remaining 12 days of the 16-day cycle. The vagina of the immature female is closed before the first heat period, and it is also closed during pregnancy and after castration in the adult.

In the present study the total dosage of estrogen was administered in 2 injections, half on either side of the closure membrane at the top of each horn of the crescentic depression extending across the perineum. Observations made at close intervals show the following stages of reaction:

*Line formation:* An intense blanching, usually forming in the mid-portion of the vaginal crescent.

*Dimpling:* An indentation which, since line formation may be quite transitory, often seems to be the first stage in the reaction.

*Pinpoint formation:* A pinpoint opening may occur at any place in the vaginal crescent; it may increase in size and become a slit or remain a pinpoint for several hours.

*Slit formation:* A slit-like break may follow line or pinpoint formation; the slit may be present from 3 to 18 hours before complete opening of the vagina.

*Complete opening:* with secretion of mucus and cornification of the mucosa.

The normal adult female was found less well adapted to the test than weanlings about 200 grams in weight. Opening of the vagina was effected promptly by large doses, 0.05 to 0.08 cc. of woman's blood injected into the immature guinea pig. The vaginas of the immatures remained open much longer than was the case in the normal adults (more than 2 weeks for the former, about 4 days for the latter). This suggests that progesterone in the normal cycle antagonizes estrogen.

Quantitative experiments were carried out to determine the relation of known amounts of estrogen to the interval of time between the injection and the opening. The greater the dosage administered, the less time was required for the vagina to open and the more extensive was the involvement of the closure membrane. The threshold dose in these experiments was between  $4 \times 10^{-7}$  and  $2 \times 10^{-7}$  mgm. of estrogen.

Exploratory tests (not detailed in this presentation) indicate that the primed castrated adult female guinea pig is exceedingly sensitive; and since it may be

## ENDOCRINOLOGY

### THE RELATION OF TEMPERATURE AND THE THYROID TO MAMMALIAN REPRODUCTIVE PHYSIOLOGY

R. BOGART AND D. T. MEYER

*Am. J. Physiol.*, 147: 320-328, 1946

Crystalline thyroxine and iodinated casein, and the goitrogenic substance, thiouracil, were used to control the level of thyroxine in the body of experimental rams. Semen was collected each week from 17 different rams and laboratory examinations made of the specimens.

It was found that high summer temperatures cause a lowering in the number of spermatozoa per ejaculate and in semen volume, and an increase in percentage of abnormal spermatozoa, indicating gradual impairment in the activity of the reproductive organs of these rams. When thyroxine was injected or thyro-active iodinated casein was fed, the reproductive capacities of the rams improved, and most of them were restored to a level near that of the breeding season.

Thiouracil was given during the fall breeding season to 3 normal rams. One ram received daily injections of 2.5 gm. thiouracil, the second received 10 grams of oral thiouracil daily, and the third ram was given the same thiouracil treatment as the first ram and, in addition, varying quantities of thyro-active protein orally. The thyro-active protein was given to determine whether the effects of thiouracil on reproduction were due to its toxic effects or to the hypothyroid state induced by it.

The daily injection of 2.5 gm. thiouracil caused a reduction in semen volume, spermatozoan motility and number of spermatozoa per ejaculate and an increase in the percentage of abnormal spermatozoa. Oral administration of 10 gm. of thiouracil per day had less effect on reproduction than the daily injection of 2.5 gm. When thyro-active protein was fed simultaneously with daily injections of 2.5 gm. thiouracil, the effects of thiouracil on reproduction were lessened.

Since the temperatures which will reduce fertility in the ram are below the temperature at which the testes normally function, and since thyro-active materials restore reproductive activity during periods of high temperature, the authors conclude that temperature is not influencing reproductive physiology by its direct effect upon the testes. The stimulating effect of thyroxine during periods of high temperatures and the harmful effect of thiouracil administered during the normal breeding season suggest that the level of thyroid function influences the relative activity of the reproductive organs. 6 figures.



quate estrogen therapy. Patients over 35 with excessive bleeding should always have a diagnostic curettage. It is in the treatment of menopausal symptoms that estrogen therapy has been most used—and most abused. Estrogens should not be given routinely at this time, and when given, they should be limited to the duration of symptoms. Doses should be small, as the doses required for full ovarian substitution will stop the sexual involution at the climacteric. The writer believes that the daily dose of premarin in the treatment of climacteric symptoms should not exceed 0.625 mg., that it should be given cyclically and should not be continued longer than 4 to 6 months. "Estrogens are no cure for the domestic conflicts, financial worries, or psychopathies which may befall the woman at the climacteric."

Progestin, which is important in regulation of the menstrual cycle, in preparation of the endometrium for nidation and in the hormonal physiology of pregnancy, is available in an orally active form. The author has found progestin to exert no specific effects in dysmenorrhea. Progestin has been used with estrogen in the treatment of threatening and habitual abortions. However, there is growing belief that progestin is of minor importance in these conditions; some clinicians employ estrogens alone with good success. The most important and specific application of progestin to therapy is in the treatment of functional excesses of uterine bleeding. The prolonged bleeding may be controlled by oral administration of premarin, and the underlying disturbance may be corrected by cyclic estrogen-progestin therapy after hemostasis has been effected. This form of therapy regulates bleeding and is usually followed by a resumption of normal ovarian and pituitary functions, evidenced by normal ovulatory cycles.

The characteristic member of the androgens is testosterone, available commercially as testosterone propionate. It is usually given intramuscularly in an oil medium. Androgen therapy of the hypogonadal male produces results as dramatic as those produced by estrogen therapy of the hypo-ovarian female. It may be used as a trial when the so-called climacteric is thought responsible for psychosomatic insufficiency of aging men.

It would be logical to treat gonadal deficiencies which result from inadequate pituitary stimulation with preparations containing pituitary gonadotropin. Unfortunately there are no satisfactory pituitary gonadotropins available. Equine gonadotropin has the property of provoking allergic sensitivities and prolonged therapy produces antibody formation. The important effect of equine gonadotropin is on the follicular apparatus of the ovary. If hypo-functioning ovaries are capable of being stimulated, therapy with equine gonadotropin will produce follicular maturation and carry this up to the immediate preovulatory stage.

The role of chorionic gonadotropin in physiology is concerned with pregnancy. Its most vital application to the treatment of women is for ovarian stimulation, particularly when sterility is the problem. It constitutes a part of a therapy called cyclic one-two gonadotropic therapy. This method of treatment takes advantage of the ability of equine gonadotropin to produce follicle maturation

used over and over, may prove to be the animal of choice for these assays. 4 figures.

(The high standing of these trained investigators would in itself lead us to accept their belief in the sensitivity of the test they describe, and the value of the weanling guinea pig as a test object for estrogen assays. For the present it would seem that the method would be of greater value to the experimental investigator than to clinical laboratory workers. —Ed.)

## SOME ASPECTS OF SEX ENDOCRINOLOGY IN GENERAL PRACTICE

E. C. HAMBLÉN

North Carolina M. J., 7: 533-539, 1946

The physician should be familiar with the physiologic, pharmacologic and chemical characteristics of the various hormones, and should know hormones, not trade names. Many hormones possess both metabolic and sexual properties and while both properties may be indicated in the treatment of one patient, only one may be indicated for others. In the latter, side actions of hormones may provoke undesired responses.

Most thyroid therapy is empiric, and unnecessary thyroid therapy is not without danger. One of the dangers is thyroid addiction. In normal patients empiric thyroid therapy may depress the intrinsic function of the thyroid gland and produce a pharmacologic hypothyroidism. Desiccated thyroid should be administered only to patients with clinically evident hypothyroidism. A low basal metabolic rate cannot be used as the only basis for the diagnosis of hypothyroidism, but should be correlated with clinical symptoms and signs. U.S.P. preparations of desiccated thyroid should be given, the entire daily dose at one time, starting with small doses (even in severe hypothyroidism) and increasing at 3 to 4-week intervals. There is no need to give thyroid medication except by mouth.

There is likewise no need to give estrogens by injection; a more even therapeutic effect is produced by oral administration, and the patient is spared the psychologic conditioning accompanying the belief that good health is dependent on hypodermics. The natural estrogens are better tolerated by the patient and have metabolic actions which the synthetic estrogens do not have. The only advantage of the synthetic estrogens is their cheapness. The author prefers premarin, a mixture of conjugated estrogens; a 1.25 mg. tablet of premarin has been found equivalent pharmacologically to a 1 mg. tablet of diethylstilbestrol. Estrogen therapy does not stimulate the ovaries, but rather depresses their function; therefore, estrogen therapy is substitutional, not stimulative. The writer believes that all estrogen therapy should be given in a cyclic fashion. Functional excesses of uterine bleeding may be stopped in 2 to 5 days by ade-

Progesterone may be used in functional uterine anovular hemorrhage in young girls. During the first 4 months of pregnancy, progesterone may be given to prevent threatened and habitual abortion.

The use of the gonadotrophins is, at present, clinically useless.

Testosterone propionate and methyl testosterone may be used in certain conditions when the estrogens are contraindicated. Patients suffering from menopausal symptoms may be treated with androgens. The dysmenorrhea associated with endometriosis is also amenable to androgen therapy.

Combined with iron, thyroid extract may be used in amenorrhea. It sometimes benefits patients having functional hemorrhage.

(A brief review which should be of value to general practitioners especially, since the viewpoint is conservative and sound. The author's statement that "the use of the gonadotrophins is, at present, clinically useless" may be contrasted with the discussion of this topic in the preceding abstract of the paper by Hamblen. It illustrates the difference of opinion on which I commented in connection with the preceding abstract.—Ed.)

to the preovulatory phase, and employs the ability of chorionic gonadotropin to induce ovulation of the adequately preformed follicle and subsequently to stimulate unfolding and functioning of the corpus luteum. This treatment is rarely curative; it represents in reality substitution at the pituitary level. Continued substitution is impossible because of the danger of antihormonal phenomena, the expense of commercial preparations and the nuisance of repeated injections.

(This is an excellent general resumé by an experienced endocrinologist. The portion of the paper dealing with the pituitary gonadotrophins, as represented by the last two paragraphs of the abstract, is of necessity less clearly defined than the other topics discussed. This is no reflection on the author, because we still do not have available for clinical use adequate pituitary gonadotrophin, and there is still much uncertainty as to any possible effect of either the equine or chorionic gonadotrophins upon the human ovary. There is therefore much confusion and difference of opinion as to whether they are of much value in the treatment of ovarian deficiencies.—Ed.)

## HORMONES IN GYNAECOLOGY

W. I. HAYES

M. J. Australia, 2: 663-666, 1946

The writer presents a brief account of the action of the pituitary gland, the ovary and the placenta, and describes some hormonal abnormalities including amenorrhea, disorders of the menopause, anovulatory menstruation, metropathia hemorrhagica and hirsutism.

The clinical use of sex hormones is then discussed. The symptoms associated with the menopause may be speedily relieved by stilbestrol in the minimal amount necessary for relief. The clinician must remember that any hemorrhage in menopausal women may be a sign of malignancy.

The introduction of chemotherapeutic agents has reduced the value of estrogens in the treatment of gonococcal vaginitis in children.

Primary dysmenorrhea with uterine hypoplasia may be treated with stilbestrol but although many patients are helped, the results are not very satisfactory.

Medicinal induction of labor when the fetus has been dead for more than a few days is usually unsuccessful because of the lack of placental estrogen. Success usually follows the administration of stilbestrol.

Remarkable results have been reported with the administration of stilbestrol and pregnenolone to pregnant patients with diabetes, sufficient to justify its use in this condition. This does not replace the usual dietary and insulin treatment.

Stilbestrol may be given to prevent lactation, together with fluid restriction and absence of nipple and breast stimulation.

Some of the conditions for which estrogens should not be used are hirsutism, sterility, amenorrhea and uterine inertia.

THE PSYCHOSOMATIC ASPECT OF DYSMENORRHEA;  
A SENSORY CONDITIONING PROCESS

W. E. HUNTER AND B. B. ROLF

Am. J. Obst. &amp; Gynec., 53: 123-131, 1947

The synthesis and analysis of stimuli that come from within and without are functions of the cerebral cortex. From this hypothesis the authors attempt to show in this paper that dysmenorrhea for the most part is a normal sensory conditioned process that reaches abnormal levels.

Most dysmenorrheics have been shown to have lowered pain thresholds, and are more susceptible to sensory stimuli than those with normal thresholds. By a sensory conditioning process the symptoms of pelvic discomfort, bladder irritability, intestinal disorders, headache, fatigue, backache, and emotional upset are exaggerated. The predominant symptom is more often expressed as pelvic pain, since menstrual bleeding focusses the attention in the pelvis. The symptoms are initiated by the physical changes, such as temperature shifts, intracellular edema, muscle tonicity, breast changes and vasomotor changes produced by corpus luteal activity.

Sensory conditioning is a stepped-up process of perception induced by repetition. Examples of this process in experimental psychology are cited. For example, Ellson, by associating sound with light over a period of time, found that 80 per cent of his subjects reported hearing sounds when the light was shown and no sounds made. Another sensory conditioning process is the intractable pain of phantom limbs, where the conditioning occurs through the repeated painful impulses arising from chronically irritated nerve endings before amputation. The writers believe that by a normal process of sensory conditioning, whereby repetitive, painful monthly stimuli above the threshold level increase the sensitivity to further stimulation, a neurosis is developed and the dysmenorrheic's threshold for pain is further reduced. If, by psychoanalysis, the patient can be made to believe that the cause has been removed, the pain threshold is elevated and the symptoms relieved.

The writers have relieved cases by surgical and medical means, and have relieved an equal number by placebos and by suggestion, and also by suggestion under hypnosis. They believe that one method is as satisfactory as another, except when definite pathology is present. They believe that suggestion, either consciously or unconsciously, enters into the treatment of most cases of dysmenorrhea, since the percentage of cures as reported from either scientific or unscientific sources averages about the same, except by castration or pre-sacral neurectomy. 2 figures.

(Everyone is agreed that the psychogenic factor is of very great importance in primary dysmenorrhea. Indeed, there are some who believe it to be the fundamental one in every case, a view which I do not share. Whatever the still unknown local uterine factor may be and whether this be a heightened and painful over-contractility of the uterine muscle, a vascular spasm, an endocrine imbalance or what not, it is easy to see that a psychic factor

## THE MENSTRUAL CYCLE

### TIME OF OVULATION

#### FROM "CURRENT COMMENTS"

Internat. Med. Abst. & Rev., 1: 24-26, 1947

The objective ways of trying to determine the exact time of ovulation are discussed. Although in all cases the finding of luteal endometrium in biopsy or curettement specimens indicates that ovulation has occurred, it is extremely difficult to tell the exact day of ovulation; even if this were determined, it would not follow that ovulation would take place in subsequent months on the same day.

Knaus believes that in the first half of the menstrual cycle the uterus reacts to pituitary extract, but loses this response 48 hours after follicle rupture; this is denied by other investigators.

Cases in which pregnancy has been reported as following a single coitus are valueless because of the unreliability of patients' reports.

Various workers claim that there is a rise in gonadotrophin excretion at ovulation, usually preceded by peaks of estrogen output. The excretion of pregnandiol has been observed to rise after ovulation, then fall before the onset of bleeding. Further studies are necessary before these hormone studies can prove useful.

Some workers have noted a rise in electrical potential in rabbits at the moment of follicle rupture, but such methods have been found unsuitable for the detection of ovulation in women.

Not all are agreed on the value of the basal body temperature in determining the day of ovulation, but there is no doubt that for many women graphs properly plotted do reveal the day of ovulation, as proved by successful pregnancies planned according to the graphs. The vaginal smear as a means of observing cyclic changes, although of great value, has limited applicability.

D'Amour studied 20 menstrual cycles of 5 women using the following sources of information: gonadotrophin assay, estrogen assay, pregnandiol determination, vaginal smears, body temperature and subjective experiences. The purpose was to evaluate these tests on the basis of uniformity of occurrence of positive results and synchrony of their appearance. It was concluded that because of its sharpness and apparent close association with ovulation, the mid-interval gonadotrophin peak is most indicative of the exact time of ovulation. Hormonal assays and vaginal smears were valid. Body temperature fluctuations were not sufficiently regular or clear-cut to be reliable. Subjective experiences were valueless as tests for ovulation.

a precursor (or metabolite) of estrogen with the property of inhibiting the production of the follicle-stimulating hormone.

The following are the steps to be followed in establishing a diagnosis of "hypothalamic amenorrhea": (1) a history of psychic trauma just preceding the onset of amenorrhea is obtained, if possible; (2) excretion of the follicle-stimulating hormone is found to be normal, thus eliminating amenorrhea due to disturbance primary in the pituitary or ovaries; (3) absence of estrogenic effect on pelvic tissues is revealed by endometrial biopsy and vaginal smear, and by failure of the endometrium to respond with bleeding to estrogen-withdrawal is demonstrated by administration and withdrawal of an adequate course of estrogen. A moderate decrease in the urinary excretion of 17-ketosteroids is consistent with the diagnosis of "hypothalamic amenorrhea".

This condition is relatively benign in many patients and may spontaneously disappear after the stressful situation is eliminated. In others the psychological disturbance is more deeply rooted and requires intensive psychiatric treatment. The induction of regular cyclical bleeding by administration and withdrawal of gonadal hormones may help to convince some patients that nothing is organically wrong and result in the return of normal menstruation. The continuous administration of oral diethylstilbestrol in rather small doses may stimulate the anterior pituitary to produce increased amounts of luteinizing hormone. In one of the 2 cases presented in this paper the patient had 2 menstrual periods *with cramps* (which usually indicate bleeding from a secretory endometrium, hence, ovulation) after treatment with small doses of diethylstilbestrol. 2 figures.

(There has been increasing evidence in recent years as to the importance of the hypothalamus in many of the most vital functions of the body, including probably regulation of pituitary function, though the mechanism by which this is brought about is not known. The hypothalamus is likewise concerned in emotional reactions of various sorts, such as fear, and it is probably the connecting link between the endocrine glands and the higher centers. Psychogenic disorders of menstruation, such as amenorrhea, are probably to be explained in this way. It is in the hypothalamus, too, that many locate the still rather hypothetical sex center, and the existence of such a center is supported by the sex effects, such as menstrual disorders or precocious puberty, produced by tumors in this region.

Certain body changes, such as obesity and fluid balance disorders, which are not infrequently associated with amenorrhea, are probably referable to disturbances in the hypothalamus and the floor of the third ventricle rather than to the pituitary itself. These parapituitary effects need not necessarily be combined with dysfunction of the hypophyseal gonadotrophes, for they may occur even without any disturbance of menstruation. The common adiposogenital dystrophy, with its characteristic obesity and amenorrhea, is the best example of combined pituitary and parapituitary dysfunction. But the same type of adiposity may be seen in women who menstruate normally and who are often very fertile.

While observations of this sort point strongly to the important role played by the hypothalamic area in many sex phenomena, it is not easy to follow Reifstein in his speculations as to the pattern of hypothalamic amenorrhea, which probably is still to be explained by pituitary dysfunction as the immediate cause. In the psychogenic variety of amenorrhea, produced by such emotions as fear, it seems unlikely that the secretion of the follicle stimulating hormone (FSH) remains normal, although I do not believe that any direct studies on this point have been made.

could well be superimposed upon it, and that psychosomatic management must of necessity be envisaged in the treatment of every case of primary dysmenorrhea.

Psychiatrists have become much interested in many of the functional gynecological problems, and a number of articles contributed by psychiatrists have appeared within the past year or two. Some of these have been commented on editorially, and I am afraid that these comments may have seemed harsh. However, the authors have not been able to couch their discussions in a language understandable to the average gynecologist, and thus have been of little help to him in his everyday problems.

Certainly it is not necessary to call in a psychiatrist in the management of most cases of primary dysmenorrhea, presupposing that the gynecologist is a man of good common sense who appreciates the role of the psyche in all subjective disorders of this type, and that he is willing to take the time to study the patient as a whole, this including both mind and body. The man who simply scribbles off a prescription for an analgesic, or who starts the patient off on a career of "shot" endocrine therapy, is not only a poor psychiatrist, but also a very poor gynecologist.—Ed.)

## PSYCHOGENIC OR "HYPOTHALAMIC" AMENORRHEA

E. C. REIFENSTEIN, JR.

M. Clin. North America, 30: 1103-1114, 1946

The writer describes the hormone pattern of menstruation in normal women and the hormone pattern found in the nonhypothalamic amenorrheas. In such amenorrheas, if the pituitary does not produce any of its gonadotrophic hormones, the ovaries will not produce estradiol; the follicle-stimulating hormone excretion in the urine will be subnormal, and the endometrium and vaginal mucosa will show an absence of estrogenic effect. If the pituitary produces its hormones but the ovaries do not, the follicle-stimulating hormone excretion in the urine will become excessive and the endometrium and vaginal mucosa will show an absence of estrogenic effect. If both the pituitary and the ovaries produce their hormones normally and the endometrium cannot respond, the follicle-stimulating hormone excretion in the urine will be normal and the vaginal mucosa will show evidence of adequate estrogenic effect.

The hormone pattern in "hypothalamic amenorrhea" shows a normal excretion of the follicle-stimulating hormone in the urine, in spite of complete lack of estrogen. No bleeding follows a course of progesterone, but the endometrium is capable of responding to estrogen. Many of these patients have readily detectable psychogenic factors complicating the amenorrhea. It is suggested that the primary difficulty in these cases is a loss of nerve impulses from the hypothalamus so that the pituitary does not release the luteinizing hormone. The discharge of nerve impulses from the hypothalamus is presumed to be blocked by the psychological disturbance. With complete absence of luteinizing hormone, the follicle does not produce estrogen. The fact that there is not an increased production of follicle-stimulating hormone may possibly be because the follicle-stimulating hormone is stimulating the ovary to produce some hormone which is



gested, a physical rupturing effect on persistent cystic condition of the ovaries which prevented their normal functioning. This effect was also suggested by Rock and his associates, who believed that x-ray ruptured mature ovarian follicles which failed to rupture spontaneously.

At present the author is inclined to attach prime importance to the pituitary as the factor controlling menstrual function. Whether the pituitary can be affected by irradiation so as to induce hormonal effects, thereby bringing about ovulation, is still a moot question. Two cases are presented which seem to be definitely representative of the pituitary influence. Both patients had the usual hypopituitary physical appearance. The first patient menstruated only twice per year, the second at about 3-month intervals. Medical care in both cases had brought no improvement. X-ray treatments to the ovaries and pituitary were followed by pregnancy in each instance.

All treatments carried out by the author were with high voltage x-rays delivered to the ovaries and, in most instance, to the pituitary as well. In a few instances, the thyroid was also irradiated. As a rule, only one series of 3 treatments over a 3-week period was administered. The x-ray factors were 200 kv., 10 ma. with 0.5 Cu. plus 1 mm. Al filter at 50 cm. distance. Treatment was directed through the anterior and posterior right and left pelvic fields, with 8 by 10 cm. or 12 by 15 cm. portals, and to the pituitary through a 6 by 8 cm. field. The dose was 50 to 75 r per treatment, given at weekly intervals for 3 weeks. The dose to the pituitary at each treatment was 75 r through the forehead.

(It is hard to take a very firm stand as to the place of x-ray in the treatment of amenorrhea. On the one hand, a minority of enthusiasts, like Kaplan, report large numbers of patients thus treated, with apparently good results in most of them, and with insistence that no harmful results were noted in the offspring of those patients who conceive. And yet, though the method has been employed for at least a quarter of a century, a large proportion of gynecologists have hesitated to use it, and some who formerly employed it have given it up, presumably because of disappointment with the results.

The consideration which has inhibited many of us in too free an employment of such therapy is the warning of certain geneticists, like Little, that the possible hazard concerns not necessarily the immediate progeny, but subsequent generations, although this view is based upon experimental work on lower animals rather than observations on the human. But it does seem like a rather serious responsibility, aside from the further possibility which has been urged that injury to brain tissues or to the ovaries may result. I am sure that I do not know how much truth there is in these views, but I have been constrained to be extremely conservative in the use of the x-ray; although I have employed it in a small number of cases. The indication in these cases was not the harmless condition of amenorrhea in itself, but the associated sterility in the case of women desperately anxious for the possibility of children. On the other hand, I am well aware that many excellent gynecologists use the method much more freely, and they probably look upon us conservatives as old fogies. Whether they are right I suppose time alone will tell.—Ed.)

Equally unsupported and unlikely, it seems to me, is his hypothesis that the pituitary does not produce the luteinizing factor and that this is the cause of the estrogen lack and the amenorrhea observed in such cases, and that "with complete lack of luteinizing hormone the follicle does not produce estrogen". The free bleeding so often observed in the metrorrhagia hemorrhagica type of functional bleeding, in which there is abnormally long and excessive production of estrogen together with absence of progesterone and presumably therefore of the luteinizing hormone of the pituitary, would be difficult to explain on the basis of such a hypothesis as that suggested by the author. I know of no other evidence to suggest that the luteinizing hormone is essential to the production of estrogen by the follicle. On the other hand, a pretty good case might be made out for just the opposite viewpoint, i.e., that the preliminary production of estrogen is essential to the motivation of the luteinizing hormone.—Ed.)

## THE TREATMENT OF AMENORRHEA AND STERILITY BY X-RAY THERAPY

I. I. KAPLAN

New York State J. Med., 46: 2746-2752, 1946

The writer concludes, from his experience, that irradiation, when properly given, is harmful neither to the mother nor to the offspring and that it has proved a valuable therapeutic procedure for treatment of amenorrhea and the relief of sterility.

Any woman who desires a baby, and who has failed to respond to other therapeutic measures, should have a trial with irradiation. The younger the patient the better the chance of success. The only contra-indications to irradiation are the absence or destruction of the generative organs, or tube closure. Irradiation is not indicated where sterility is due to impotency of the husband.

During the years 1925 to 1945, a total of 296 married women were treated by the author with x-ray for amenorrhea and sterility. Of the 296 patients, 70 were not traced; of the remainder, 55 failed to respond to treatment and 171 had menstruation regulated, and 90 of these became pregnant. Seventy-six went to term—14 more than once—and gave birth to 101 normal children. In this series there were 2 cases of ectopic pregnancy and 10 miscarriages, 3 several times. Six patients are still pregnant and one patient was therapeutically aborted. Two patients were retreated and gave birth to a second child. Two women who did not respond adopted babies and one of these is now pregnant.

There are still some questions as to the exact mode of action of x-ray therapy in the female. Whether such therapy as used for amenorrhea and sterility directly affects the ovary, the uterus or the pituitary is not known. In some cases of prolonged sterility following pregnancy it is thought that x-ray, when successful, acts by destroying the inhibitory function of a persistent corpus luteum which presumably prevented menstruation. Cases are cited which tend to support this supposition.

In some cases it was thought that the action was as Stein and Levinthal sug-

Two hundred and ten patients presenting *Trichomonas vaginalis* were treated according to such plan, and from them, 191 (90, 95%) were cured.

(This addition to the rich assortment of treatments for trichomonas vaginitis has at least the virtue of novelty. Why the lowly coal-oil should have any beneficial effect I have no idea, nor is this explained by the author. If your reliance on reported cure rates exceeds your scepticism, you may wish to try the plan.—Ed.)

## SULFATHIAZOLE SUPPOSITORIES IN TREATMENT OF VULVOVAGINITIS IN CHILDREN

F. W. SCHACHT AND K. E. BARBER

J. Urol., 56: 429, 1946

The writers find small cocoa butter suppositories with  $7\frac{1}{2}$  gr. (0.5 gm.) sulfathiazole powder incorporated satisfactory in treating vulvovaginitis in children. The nightly introduction of these suppositories has reduced treatment from what formerly took one year to approximately 8 weeks of care. The patients cooperate willingly and the mothers are relieved by the simple, painless procedure. The presence or absence of discharge, soiling, and the appearance of the mucous membrane determines whether or not treatment is to be continued. Cultures are taken with apparent cure and the patient instructed to report after 2 weeks' lapse of treatment. In the authors' entire group only one slight skin reaction was noticed. Results were most satisfactory.

(Penicillin and sulfa drugs have apparently displaced the estrogens in the therapy of gonorrheal vulvovaginitis of children in most clinics, but not all. In our own clinic estrogen therapy continues to be employed with very satisfactory results, and the report of Te Linde and Brawner in 1935 (*Am. J. Obst. & Gynec.*, 30: 512, 1935) stressed the enhanced value of this plan when the estrogen was applied locally in the form of estrogen suppositories. However, there is not the slightest reason why a double-barreled plan should not be carried out, especially as there are increasing reports of penicillin resistant strains of gonococci.—Ed.)

## VULVA AND VAGINA

### HYDRADENOMA OF THE VULVA

CESAR A. BREA AND RAMIRO P. DUNI

Bol. Soc. Obst. y Ginec. de Buenos Aires, 25: 188-196, 1946

A 33-year-old woman presented 2 small superficial growths in the right labia majora, which, following simple removal, were examined pathologically and showed to be hidradenoma. There was a double layer of cells presenting the characteristics of the apocrine type of glands.

A discussion on the different clinico-pathological aspects of this type of tumor follows.

This case constitutes the third one described in the Argentine literature.

(This was apparently a typical case of hidradenoma (not hydradenoma), the unusual feature being that it was multiple. These interesting growths are undoubtedly of sweat-gland origin. Some believe them to have their source only in the apocrine variety of sweat glands, although I do not think that this can be considered as clearly established. The growths are found on almost any part of the vulva or its immediate vicinity. The most recent one I have seen was found just within the introitus on the anterior vaginal wall, arising in what must have been aberrant sweat glands. The lesions are always small, usually not more than 1 to 1½ cm. in diameter, and they are often removed incidentally during plastic operations under the impression that they are sebaceous cysts or small fibromas. The microscopic picture is quite characteristic, and usually leads to a diagnosis of adenocarcinoma if the pathologist is not familiar with this relatively rare but perfectly benign lesion. A complete review of the subject, with the report of a considerable group of cases, is to be found in the paper of Novak and Stevenson (*Am. J. Obst. & Gynec.*, 50: 641, 1946).—Ed.)

### TRICHOMONAS VAGINALIS

ROMEO A. BROLLO

Bol. Soc. de Obst. y Ginec. de Buenos Aires, 25: 136-141, 1946

A new plan of treatment for Trichomonas of the vagina is reported by the author. This consists of vaginal douches with a solution composed of a liter of warm boiled water to which a small spoon-full of kerosene has been added. While douching takes place, the solution is thoroughly stirred. This treatment is repeated every 3 days, and after 20 to 30 days a new microscopic examination is done. If trichomonas are still present but have diminished in amount, the douches are carried on every 5 days and later every 7 days. Treatment is suspended following 2 negative tests.

there was one sarcoma to 47 cancers of the uterus. With reference to the occurrence of sarcomatous change in myoma, Masson states that of 4,322 patients operated on for uterine myoma at the Mayo Clinic, 44, or about one per cent, were found to have sarcomas. The writer calls attention to the great preponderance of corporeal over cervical sarcomas—a proportion similar to that of corporeal and cervical myomas, while it is exactly the converse of that relation to corporeal and cervical carcinoma.

Uterine sarcomas are usually comprised of homologous tissue; there may be very immature and indifferent elements, the round or spindle cell sarcoma, or less immature and better differentiated cells, the fibro- or leiomyo-sarcoma, or mixtures of both.

Sarcomas of the uterus appear most frequently at or about the menopause. A myoma may exhibit the following 3 distinct types of malignancy: (1) malignant leiomyoma, a growth composed of young, unstriped muscle cells, capable of producing metastases; (2) sarcoma formed from muscle cells by malignant metaplasia—also sarcoma formed from intermuscular connective tissue; and (3) endothelioma and periendothelioma, sarcomatous types of lower malignancy arising from blood vessels and lymphatics of the myoma.

These tumors may remain quiescent, growing very slowly over a long period, and then rapidly developing. True metastasis in glands and distant organs may occur, but the manifestations of malignancy occur later with sarcoma than with carcinoma. Physical examination reveals a uterine tumor which, in a large percentage of cases, will be regarded as a myoma. To the triad of usual symptoms (hemorrhage, discharge and pain) must be added pressure on neighboring organs, due to the large size which sarcoma may attain. Another sign is early cachexia. Whenever a myoma shows signs of degeneration, particularly after the menopause, it should arouse suspicion of sarcoma. If ascites supervenes in the case of a myoma, and if a patient becomes cachectic and loses weight, the evidence is significant of malignancy.

The prognosis in rapidly-growing sarcoma is very grave, especially with angiosarcomas. Spindle-celled, fibro- and myo-sarcomas are likely to grow slowly, whereas the round-celled growth is to be regarded as the most malignant. The average duration of life has been placed from 2½ to 3 years.

Early and prompt removal of the uterus and its appendages should be carried out in all suspected cases. Cases too far advanced for surgery may be given radium treatment, followed by x-ray. It appears to be a recognized fact that sarcomas are more susceptible to radio-active bodies than carcinomas.

(A short review of the subject. The author's classification of types is not the usual one, nor does it appear to be a good one. For example, the term malignant leiomyoma is open to the same criticism which many have leveled at "malignant adenoma". If a leiomyoma is really malignant, in that it recurs, metastasizes and ultimately kills the patient, it is a sarcoma, and should be so designated. There used to be much discussion in the older literature concerning "recurring fibroids", but in practically all these cases later study showed evidence of sarcoma. It should be remembered that sarcomatous change in a myoma may involve only localized areas in the growth, so that it may be easily missed in routine microscopic examination. One of the most conspicuous illustrations of this was in

## THE UTERUS

### DOUBLE UTERUS AND BILATERAL PYOSALPINX

ELIZABETH M. ROSE

Proc. Roy. Soc. Med., 39: 771-772, 1946

A 23 year old woman entered the hospital complaining of severe pain in the R.I.F. for the first 3 days of menstrual periods. Examination under anesthesia and dilatation and curettage revealed no abnormality. Seven months later she reported again, 3 months pregnant and complaining of slight irregular vaginal bleeding and constant pain in the R.I.F. Vaginal examination revealed a mass to the left of the uterus. Laparotomy was performed and a double uterus was found with the pregnancy in the right horn. An intravenous pyelogram revealed only one kidney and ureter on the left side. The pregnancy continued normally, and about 5 years later she had a second normal pregnancy and delivery.

More than a year later she again reported with severe and constant pain in the same position as before. There was a yellow vaginal discharge and irregular severe bleeding. There was tenderness in both iliac fossae, and on vaginal examination 2 masses could be felt, one on the left and one on the right. Operation revealed bilateral pyosalpinx with the double uterus which had a single cervix. Bilateral salpingo-oophorectomy and total hysterectomy were performed. The author discusses the practical points in patients with double uterus which are illustrated by this case.

(The association of what was evidently a bicornuate uterus with congenital absence of one kidney and ureter is of interest, and emphasizes again the frequency with which urinary tract anomalies are combined with various developmental anomalies in the genital apparatus. The case is of further interest in that it illustrates the fact that such duplication anomalies as uterus bicornis or uterus didelphys are not by any means incompatible with normal pregnancy and labor, though there are of course not infrequent exceptions. In the case of uterus bicornis, I have seen 2 or 3 instances in which repeated abortion had occurred, with later full term pregnancy after removal of one of the cornua. On the other hand, some years ago I did a double hysterectomy for rather large myomas in both uteri of a uterus didelphys, although the patient had had several full term pregnancies with normal labors.—Ed.)

### SARCOMAS OF THE UTERUS

J. W. HOFMANN

J. Indiana M. A., 39: 640-641, 1946

Sarcomas of the uterus comprise less than one per cent of all uterine tumors, with estimates ranging from 0.6 to 1.8 per cent. Krukenberg estimated that

there was one sarcoma to 47 cancers of the uterus. With reference to the occurrence of sarcomatous change in myoma, Masson states that of 4,322 patients operated on for uterine myoma at the Mayo Clinic, 44, or about one per cent, were found to have sarcomas. The writer calls attention to the great preponderance of corporeal over cervical sarcomas—a proportion similar to that of corporeal and cervical myomas, while it is exactly the converse of that relation to corporeal and cervical carcinoma.

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the case reported in 1933 by Christophorakos (*Zentralbl. f. Gynäk.*, 57: 1935, 1933). A myoma removed by hysterectomy showed only "a suspicion of sarcoma". The tumor recurred but the study of many blocks failed to show sarcoma. A second recurrence yielded the same negative results, but the third recurrence revealed definite polymorphic sarcoma in addition to the myomatous elements.

The incidence of sarcomatous change in myoma was formerly put too high by most authors, because of the incorrect inclusion of many cellular but benign growths in the category of sarcoma. Figures as high as 10 per cent were given by some. The more critical studies of recent years, however, show that the hazard of malignant change is actually slight. For example, Kimbrough's figure was 1.02 per cent (*Am. J. Obst. & Gynec.*, 28: 273, 1934), while in our own laboratory a study of 6981 myomas showed a sarcoma incidence of only 0.56 per cent (Novak and Anderson: *Am. J. Obst. & Gynec.*, 34: 740, 1937).—Ed.)

## ENDOLYMPHATIC STROMAL MYOSIS

D. N. HENDERSON

*Am. J. Obst. & Gynec.*, 52: 1000-1013, 1946

The author presents the clinical histories, follow-up records and pathologic characteristics of 7 cases of rare uterine tumors arising from the endometrial stroma. The original pathologic diagnosis in all cases was endometrial sarcoma.

Pathologically, the uteri in these cases contained one or more tumor masses which were subserous and interstitial in situation. They were nonencapsulated, of soft brainlike consistency, faintly yellow in color and of homogenous velvety texture. Microscopically, these tumors were composed of cells which for the most part resemble the endometrial stromal cell of the late proliferative phase. A most characteristic feature is the presence of numerous thick-walled blood vessels resembling the spiral arteries of the endometrium. The myometrium was invaded by broad and slender cords of tumor extending between muscle bundles and along perivascular and perilymphatic tissue spaces. Frequently these strands of tumor were seen pushing their way into lymphatic channels while still covered by intact endothelium. Vascular invasion could be demonstrated with less frequency than lymphatic invasion, but was readily established when the invaded vessel was thick-walled.

A study of the clinical histories of these cases failed to reveal symptoms or signs that could be considered distinctive for this type of tumor. In all but one case bleeding was irregular or profuse; in 5 cases the hemoglobin estimation was less than 50 per cent. Age varied from 28 to 45 years. The essential finding on examination was uterine enlargement.

All 7 cases were subjected to bilateral salpingo-oophorectomy and hysterectomy. Five patients received postoperative high voltage x-ray therapy. Six patients are alive and well, and one has died from recurrent disease.

These tumors are similar to cases that previously have been described as adenomyoma without glands, endolymphatic fibromyosis and stromal endometriosis. They exhibit pathologic characteristics which in the past frequently



have led to a diagnosis of endometrial sarcoma. It is difficult to classify them as either benign or malignant. They seem to be of low-grade clinical malignancy. However, due to the late recurrences which have been reported, long follow-up records are necessary before the degree of clinical malignancy of these tumors can be assessed. They occur during the years of sexual maturity and present signs and symptoms similar to those of uterine fibromyomas. Their relationship to endometriosis and adenomyosis is uncertain. Their pathologic and clinical characteristics are sufficiently distinctive, however, to warrant their separate classification. The writer suggests "endolymphatic stromal myosis" as a name for these neoplasms. 13 figures.

(This is an interesting study of a rather rare group of lesions, and one concerning which opinions are not yet sharply crystallized, probably because of the relative paucity of observations. The concept of the benign form is relatively simple, as it represents the lesion which we call adenomyosis except that only the stromal elements of the endometrium flow down into the musculature rather than both glands and stroma, as in the common form of adenomyosis. Whether it is worthwhile to cudgel our brains for a special designation of a lesion which, after all, is only a variant of adenomyosis, is open to question, but the discussion of Henderson's paper when it was read, as well as a survey of the few papers which have been written about it, indicates that quite a variety of terms have already been coined, viz., endolymphatic myosis, stromatosis, stromal adenomyosis, endometriosis interstitialis. I myself have been partial to stromal adenomyosis, which would seem to indicate that it is only a special form of adenomyosis. Technical objections can be found to almost any of the suggested names. For example, Henderson properly points out that the "adeno-" in stromal adenomyosis includes the concept of glands, which are lacking in the lesions in question. On the other hand, stroma is often absent in the lesions of ordinary pelvic endometriosis, and yet we do not bother to invent special names for these variations.

As for the malignant form of stromal lesion, I am frank to say that I see no logic in taking this out of the general category of endometrial sarcoma, of which it appears to be only one of a number of possible variations, some of them of low grade malignancy, some very malignant, as with almost all other malignant neoplasms. The massive polypoid architecture so often seen with other forms of endometrial sarcoma is perfectly seen in Fig. 2 of the author's paper. Moreover, it is a well-known characteristic of certain uterine sarcomas to permeate the lymph and blood channels, often massively, as in the cases described by Henderson.—Ed.)

## PREVIOUS CURETTAGE IN THE TREATMENT OF UTERINE MYOMAS

G. REGO

An. Bras. Ginec., 1: 95, 1946

During the period of a year, at the Gynecological Clinic of the University of Brazil (Rio de Janeiro), the author performed preliminary diagnostic curettages in 38 patients that were going to be operated upon for uterine myoma. In 5 cases (13%) he was able to detect malignancy by the histopathologic examination of the scrapings.

These results certainly justify the employment of such a conduct as a prophylactic measure against cancer.

(While the incidence reported by the author for endometrial carcinoma in the 38 cases of bleeding associated with the presence of uterine myoma is certainly higher than one would expect in the study of any very large series, his report emphasizes that when bleeding occurs from myomatous uteri, one cannot assume that it is produced by the myomas, and that it may not be caused by some intrauterine lesion, such as cancer. Whether or not preliminary curettage is to be done in every case is open to question, and I personally believe that it can be safely omitted in a good many patients, frequently on the basis of the menstrual history. However, when it has not been done before laparotomy, the uterus should be opened and carefully examined as soon as it is removed, so as to eliminate an unsuspected adenocarcinoma before the abdomen is closed. Although the author's paper does not include a discussion of possible cervical cancer in cases of uterine myoma, it is of even greater importance to examine the cervix very thoroughly preoperatively, especially if subtotal hysterectomy is contemplated. The risk of leaving behind an early unsuspected cervical carcinoma is of course obviated by total hysterectomy, which in most clinics is now the method of choice, unless some contraindication exists.—Ed.)

## TUBERCULOUS ENDOMETRITIS WITH MILIARY SPREAD

M. KATHLEEN LAWLOR

Proc. Roy. Soc. Med., 39: 770-771, 1946

A married woman, aged 40, attended the clinic complaining of sterility. The menstrual history was normal, with a mild degree of dysmenorrhea. On examination there were no abnormal physical findings. Biopsy of the endometrium revealed that it was secretory in type with some areas of fibrinoid necrosis and a few typical tubercles. No further investigations were carried out except a chest x-ray because the patient strongly objected to the fact that she was a tuberculous suspect. The chest x-ray was negative.

Sixteen months later she complained of malaise, fatigue, head-cold and loss of appetite. In the next month rigors, headaches, cough and clinical signs of pleural effusion appeared. She was admitted to the hospital, dyspneic and cyanosed. There was no vaginal discharge and no clinical evidence of pelvic pathology. Her condition slowly deteriorated, and in a few weeks she expired.

At post-mortem examination diffuse miliary tubercles were found in the liver, lungs, pleurae and meninges. Although the fallopian tubes and uterus appeared normal to the naked eye, microscopically there were tubercles in these organs. It was concluded that the original infection was a calcified mesenteric lymph node, then the endometrium and finally a blood-stream dissemination.

(In doing endometrial biopsies on sterility patients, one meets with an occasional surprise in the finding of definite tubercles in the endometrium. I have, in a previous number of the Survey, commented rather fully on the recent publication of Sharman (Proc. Roy. Soc. Med., (Sect. Obst. & Gynec.), 37: 67, 1943. Abstract in Survey, 1: 149, (Feb.) 1946) who

reported an incidence of fully 5 per cent of tuberculosis in a rather large number of endometrial biopsies, although I do not think that this figure would be equalled in the practice of most gynecologists. The significance of such a finding is that tuberculous endometritis presupposes tuberculous salpingitis, so that Sharman, on the basis of his own findings, properly urged that unsuspected tubal tuberculosis may be a more frequent cause of sterility than had been believed.

The case reported by Lawlor, however, appears to belong to a different category, as the endometrial tuberculosis was, from her description, not the ordinary type which is secondary to tuberculosis of the tubes. While the latter at autopsy also showed miliary tubercles, it would seem likely that the disease in both the tubes and endometrium was a part of a general miliary tuberculosis having its source in an extragenital focus, possibly a mesenteric lymph node, as she herself suggests.—Ed.)

## RECENT VIEWS ON TREATMENT OF CANCER OF THE CERVIX BY RADIOTHERAPY

MARGARET C. TOD

J. Am. M. Women's Ass., 1: 258-264, 1946

The tumor discussed in this paper is squamous carcinoma of the cervix. The most generally used method of clinical staging was devised by the special Committee on Cancer of the Cervix set up under the League of Nations Organization. To permit accurate comparison in the present study the author repeats this method of staging, which may be summarized as follows:

Stage I. Growth strictly limited to cervix; uterus mobile.

Stage II. Lesion spreading into one or more fornices, with or without infiltration of the parametrium adjacent to uterus; uterus mobile to some degree.

Stage III. (a) Nodular infiltration of parametria on one or both sides, with limited mobility of uterus, or massive infiltration of one parametrium, with fixation of uterus.

(b) Superficial infiltration of a large part of vagina, with mobile uterus.

(c) Isolated metastases in pelvic glands.

(d) Isolated metastases in lower vagina.

Stage IV. (a) Massive infiltration of both parametria.

(b) Carcinoma involving bladder or rectum.

(c) Whole vagina infiltrated, or one vaginal wall infiltrated along its entire length, with fixation of primary growth.

(d) Remote metastases.

In a series of cases treated at the Holt Radium Institute, 62 patients with Stage I disease were treated, with a 5-year net survival rate of 68 per cent. The corresponding figures for cases in the other stages were: Stage II, 466 patients, 43 per cent survival rate; Stage III, 349 patients, 26 per cent survival rate; and Stage IV, 316 patients, 5 per cent survival rate. Summarizing, there was a total of 1193 cases treated, with a 5-year net survival rate of 29 per cent. The most significant fact here is the overriding importance of treatment at an early

stage. Advance in this direction can be obtained only by education and by putting facilities within reach of women of the social environment and age groups where cancer of the cervix is common.

As regards treatment, occasionally a technically operable case treated by radiation shows by early recurrence of symptoms that the growth has been resistant, and immediate surgery is indicated. With this exception surgery and radiation should not be combined. In radiation therapy alone, the dose of radiation believed to be lethal to tumor cells must be delivered to the entire tumor, and the tolerance of normal tissue must be so preserved that normal processes of repair will remove and replace the residue of tumor. To these ends there are 2 schools of thought; one aims at concentrating the radium at a central point, the other at distributing it as far laterally as possible. The method of spreading the radium laterally takes full advantage of the shape of the vagina to place applicators against the infiltrated base of parametria.

TABLE D (From Tod)

TECHNIQUE	STAGE I		STAGE II		STAGE III		STAGE IV	
	No. Treated	5-Year Net Survival	No. Treated	5-Year Net Survival	No. Treated	5-Year Net Survival	No. Treated	5-Year Net Survival
		%		%		%		%
Complete With X-ray	23	62	244	44	212	29	55	20
Complete No X-ray	35	76	117	49	58	25	27	8
STAGES I/II SUMMATED					STAGES III/IV SUMMATED			
	Number Treated		5-Year Net Survival		Number Treated		5-Year Net Survival	
			%				%	
Complete With X-ray	276		46		267		27	
Complete No X-ray	152		56		85		20	

Table D presents the results of treatment by radium alone compared with combined radium and x-ray treatment and, although the differences are small, indicates that it is only in the late cases that x-ray seems to produce an improvement. 7 figures.

(This is an excellent statistical review of a large series of cases, and the opinions expressed by the author reflect those of most gynecologists. The results reported compare favorably with those of other clinics. A 68 per cent 5 year survival rate in the Grade I cases is gratifying, although even higher cure rates have been reported by a number of other authors. Such figures are a challenge to those who advocate very radical operation in this group, especially as the immediate mortality from radium therapy in this group is almost negligible. In spite of such modern surgical advances as transfusions, penicillin and sulfa therapy, nothing is more certain than that the immediate mortality and morbidity from radical operation, including dissection of the lymph glands, would inevitably become an important consideration if the surgical plan of treatment were very widely adopted, though it might not reach the 10 to 20 per cent figures of the old days of radical surgery. This in spite of the excellent immediate results reported by a few highly trained surgeons who are carrying out this operative plan in Grade I cases.

The League of Nations clinical classification, so widely employed, has some very definite defects. Chief among these, in my judgment, is the wide inclusiveness allotted to Group I, embracing all cases in which the lesion is limited to the cervix. This would include not only the cases involving most or all of the cervix, but also the very early and even the rare so-called pre-invasive group, in which the cure rate should be far higher than the general average for Group I. This system of classification was introduced many years ago, before the days of the intensive search for very early lesions now practiced in most good clinics. In this respect the Schmitz classification seems to me to be definitely superior, in that it assigns to its Group I only the more limited of the lesions involving the cervix alone.

Many will agree with the author in questioning the addition of complete x-ray therapy to the radium, and certainly the figures presented in Table D justify her lack of enthusiasm. Others may feel that supplementary x-ray therapy may be helpful in the effort to combat the gland dissemination factor, in spite of the greater hazard this plan imposes as regards intestinal and other visceral damage, because of the considerable increase in total irradiation.—Ed.)

## CARCINOMA OF THE CERVIX DURING THE FIRST TWO DECADES OF LIFE

R. S. POLLACK AND H. C. TAYLOR, JR.

*Am. J. Obst. & Gynec.*, 53: 135-141, 1947

A careful search of the literature reveals 30 cases of true carcinoma of the cervix which occurred during the first 2 decades; these are tabulated, and the writers add the thirty-first case. Only those cases of histologically proved carcinoma are included. The histologic type in 22 patients was adenocarcinoma. This form of carcinoma, when found in the cervix, is a relatively rare lesion. In the majority of these cases, the clinical course was progressively downward. Only 4 patients in the collected series survived 5 years.

The present case is that of an 18 year old woman who complained of irregular and heavy vaginal bleeding for the previous 2 years. She had consulted her local physician shortly after the onset of her irregular hemorrhages, and dilatation and curettage was immediately advised. This was refused by the patient because of her virginity. Stilbestrol was prescribed, and she had been taking this medication, off and on, for 2 years. The bleeding and discharge finally became so severe that dilatation and curettage was permitted; the pathologic report of the curettings was adenocarcinoma, grade III, and the patient was referred to the authors' hospital.

Examination showed the cervix to be replaced by a huge fungating tumor. The parametria were thickened and indurated on both sides with fixation on the left. Biopsy proved the tumor to be adenocarcinoma grade III.

X ray treatment was given for approximately 6 weeks, at which time the tumor was definitely movable, and an attempt at radical panhysterectomy was decided upon. At laparotomy the cervical mass was seen invading the base of the bladder on the left side, and a biopsy taken at this point was reported as

malignant. The case was therefore considered inoperable, and the abdomen was closed. Postoperatively, the patient received radium therapy to the limit of tolerance. When she was last seen, 9 months after her initial visit to the hospital, there was slight rectal and vaginal bleeding with abdominal cramps and urinary frequency. The mass had increased in size and was partially obstructing the rectum.

The authors discuss the possible part which may have been played by the estrogens in the genesis of uterine cancer. In the present case this effect cannot be ascertained, but the important lesson to be learned is that indiscriminate use of endocrine therapy for the control of abnormal uterine bleeding often masks an underlying organic cause. 1 figure.

(The fact that carcinoma of the cervix can, at least in the occasional rare case, occur in the first two decades is of interest. Had the authors included the third decade they could have gathered a far larger number of cases. I have seen a number of cases in comparatively young women in whom examination of the cervix had been long delayed, and often no examination of any kind made, merely because the age of the patient had diverted the doctor's mind from suspecting cancer. A far more reprehensible sin is to assume that the bleeding of such patients, especially if they are unmarried, is of functional nature, and to resort to organo-therapy without proper examination. I recall a patient of 32, unmarried, who had been given "shots" of one sort or another for a year or more, but in whom examination after admission to the hospital revealed an advanced carcinoma, not of the cervix, but of the posterior vaginal wall.—Ed.)

## CANCER OF THE CERVIX; A STUDY OF THE EFFECT OF INTERSTITIAL RADON NEEDLES AS COMPARED WITH ROENTGEN THERAPY GIVEN THROUGH INTRAVAGINAL CONES

H. C. TAYLOR, JR., AND G. H. TWOMBLY

*Am. J. Roentgenol.*, 56: 513-522, 1947

Two equal and comparable groups of primary cases of carcinoma of the cervix coming to the gynecological clinic of the Memorial Hospital during the years 1943 and 1944 have been studied.

One group was treated with divided dose roentgen therapy to the pelvis and intravaginal roentgen therapy to the parametria and cervix through special cones. This program of roentgen therapy was followed by intracervical radium. The second group of cases also received divided dose external roentgen therapy and intracervical radium, but the intravaginal roentgen treatments were replaced by interstitial radon therapy delivered by means of needles inserted into the parametria at the time the radium was applied to the cervical canal.

At the writing of this paper, from 9 to 34 months after treatment was begun, 54 of 113 cases (or 48 per cent) treated with intravaginal cones are alive and apparently free of cancer; 39 (or 34.5 per cent) are dead. Twenty-six of 94

cases (or 28 per cent) treated with interstitial needles are alive and apparently free of cancer; 52 (or 53 per cent) are dead.

The patients treated with needles had more severe rectal symptoms (diarrhea, bleeding, stricture and fistula), more bladder symptoms (dysuria, frequency, hematuria and fistula), and more local necrosis, hemorrhage and pain than did those treated with vaginal cones.

The writers have concluded that *in their experience* the use of interstitial radon needles is relatively ineffective and dangerous as a method of controlling cervical cancer, and they have abandoned it in favor of intravaginal and external roentgen therapy combined with intracervical radium. The final results of this treatment are, however, not yet known. 4 figures.

## COLPOSCOPY IN THE EARLY DIAGNOSIS OF CANCER OF THE CERVIX

ALBERTO H. ROCHA

Obstetricia y Ginecologia Latino-Americanas, 4: 728-729, 1946

By using a colposcope, the author was able to detect 7 early cases of cervical cancer (2 initial and 5 incipient) out of 800 colposcopies performed in patients seeking treatment for other gynecological conditions. Pregnancy was present in 1 case, prolapse of the uterus in 1 case, syphilis in 3 cases and lymphogranulomatous proctitis in 1 case. The colposcopic diagnoses were confirmed by histopathological examinations. The colposcopic pictures encountered pertained to pattern IV (carcinomatous leukoplakia) and all were associated with other pictures represented by mosaics, "bases", or leukoplakia, as well as inflammatory lesions.

Besides these 7 early cases, there were 23 others in an already advanced stage, which did not show characteristic colposcopic pictures. In 4 patients the colposcopic diagnosis was of pattern IV, which, on the other hand, was not confirmed by histopathologic examination. The latter only showed patterns I, IIb, IIc and III.

In a few of the incipient cases, biopsies were performed in the vicinity of the atypical epithelium, and they all showed cervicitis. In others, several sections taken from the surgical specimens showed no other neoplastic area.

Pattern III ought to be considered as an immediate precursor of cancer, whereas pattern IV is an already carcinomatous degeneration.

The author advises the use of colposcopy before performing biopsies or electrocoagulation of the cervix. Should an area of atypical epithelium be thus revealed, amputation of the cervix is indicated. It is a valuable procedure for diagnosing incipient cervical cancer, at a stage when it cannot be clinically detected.

(The method of examining the cervix under magnification by the colposcope, described by Hinselmann in 1925, has never achieved wide usage in this country, and I know of no American clinic in which it is now employed. In the German clinics it was extensively employed before the war, and it is still used in quite a number of European clinics. For example, I have recently received a fine monograph by Wespi, of Zurich, reviewing the general subject of colposcopy and detailing his results in the colposcopic examination of a large number of patients. He is still enthusiastic about the method. The consensus, however, appears to be that it is of little value in the decisive diagnosis of clinical cancer, and that equally good results are obtained by simpler methods, such as minute inspection of the cervix in good light, together with biopsy of suspicious areas. Such methods as colposcopy and the Schiller test, often used together, served a valuable side-purpose in that they emphasized very intensive study of the cervix, rather than casual inspection and palpation.

The lesion spoken of by Rocha as Pattern III is the one commonly designated as preinvasive cancer, while Pattern IV is frank carcinoma, with invasiveness as well as intraepithelial cell changes.—Ed.)



## THE ADNEXA

### COEXISTING CANCER OF THE OVARY AND FUNDUS

C. J. ANDREWS AND R. B. NICHOLLS

Am. J. Obst. & Gynec., 53: 75-77, 1947

The authors present the case of a 47 year old woman whose chief complaint was irregular bleeding for the past 2 years; this irregularity was described as prolonged periods, resulting in almost continuous bleeding. The pelvis was filled with a large irregular mass extending nearly to the navel. Endometrial biopsy showed adenocarcinoma; cervical biopsy showed cervicitis only. Deep x-ray therapy was administered, and 4 months after she was first seen, the patient was subjected to surgery. At this time the mass was most prominent in the right pelvis and, on opening the abdomen, was found to be derived from the right ovary. Adherent to the mass were many loops of intestines, ileum and sigmoid. The uterus was of normal size. No nodules were palpated in the liver and there were no palpable retroperitoneal glands. The right ovarian mass was ruptured during removal, and was found to contain a large amount of pus which apparently was coming from the degenerating ovarian malignancy. Bilateral salpingo-oophorectomy and panhysterectomy were done. The laboratory diagnosis was "adenocarcinoma and multilocular cystadenoma of one ovary; adenocarcinoma of the uterus; chronic endocervicitis, chronic salpingitis, bilateral." The patient is well 6 years after operation and shows no evidence of cancer in the pelvis or elsewhere.

The tumor was obviously partly radiosensitive, and this effect, no doubt, rendered operation and cure possible. Ewing has suggested that spontaneous regression of these tumors occasionally occurs. Meigs attributes the regression of papillary peritoneal implants following bilateral salpingo-oophorectomy to the removal of some of the source of estrogen. The writers suggest that all of these influences may have aided in the remarkable recovery of this patient.

Abstracts of 3 cases of cancer of the ovary and fundus found in the literature since 1920 are presented. As to whether such tumors originate more frequently in the ovary or uterus there is some difference of opinion. Since cancer is more commonly transmitted through the lymphatics, there is much evidence in favor of Novak's belief that they commonly originate in the uterus and are transmitted to the ovary through the lymphatics. In the present case the ovarian tumor was far advanced and extensive, whereas the uterus was almost of normal size, and the endometrium only was involved; it would seem reasonable to suppose that the ovary was the original site. The fact that the type of cancer cells are identical in both ovary and uterus would lead one to believe that they were not of independent origin.

(The apparent recovery of the patient described in this report is one of those vagaries which every surgeon will occasionally encounter on either side of the ledger. In some very

(The method of examining the cervix under magnification by the colposcope, described by Hinselmann in 1925, has never achieved wide usage in this country, and I know of no American clinic in which it is now employed. In the German clinics it was extensively employed before the war, and it is still used in quite a number of European clinics. For example, I have recently received a fine monograph by Wespi, of Zurich, reviewing the general subject of colposcopy and detailing his results in the colposcopic examination of a large number of patients. He is still enthusiastic about the method. The consensus, however, appears to be that it is of little value in the decisive diagnosis of clinical cancer, and that equally good results are obtained by simpler methods, such as minute inspection of the cervix in good light, together with biopsy of suspicious areas. Such methods as colposcopy and the Schiller test, often used together, served a valuable side-purpose in that they emphasized very intensive study of the cervix, rather than casual inspection and palpation.

The lesion spoken of by Rocha as Pattern III is the one commonly designated as preinvasive cancer, while Pattern IV is frank carcinoma, with invasiveness as well as intraepithelial cell changes.—Ed.)

meal, barium follow-through and enema, tests for occult blood, cholecystography, gastroscopy and sigmoidoscopy all gave negative results. The patient was given deep x-ray therapy to the pelvic organs and has remained well. X-rays of the spine were negative. When last seen, 8 months after operation, the patient had gained weight and there was still no evidence of a primary growth nor of enlargement of the other ovary.

(This case is almost identical with one reported by Dr. C. J. Andrews, of Norfolk, Va., and in which, through his kindness, I saw both the patient and the microscopic sections (South. M. J., 27: 597, 1934). While there is no doubt that the Krukenberg tumor is practically always secondary, usually to a primary gastro-intestinal carcinoma, there are several cases in the literature in which the evidence for a primary ovarian origin is very convincing. Simple operative exploration is not enough to warrant such an assumption, nor is even postmortem study unless the examination is very meticulous, so as to rule out a possibly minute primary lesion.

On the other hand, Dr. Andrews' patient had had no gastro-intestinal symptoms before operation, and repeated postoperative x-ray studies of the gastro-intestinal tract were negative. What is more important, she is still living at least 13 years after operation for what microscopically was a typical Krukenberg tumor. The case reported by Daley is quite similar, although only 8 months had elapsed after operation. A third case of this general type was recorded by Frankl, and a fourth by Neumann, although the circumstances in the latter were somewhat different, the Krukenberg tumor being associated with a pseudomucinous cystadenoma.

At the present writing I have in the hospital a girl of 11 who had had a unilateral removal of the adnexa for an ovarian tumor which microscopically proved to be a very anaplastic, medullary carcinoma showing large numbers of signet cells like those seen in Krukenberg tumors, though the pattern was not at all like that seen with the latter type of tumor. The tumor recurred with amazing rapidity, so that when I saw her 2 months after the original operation there was a large lower abdominal mass extending to the umbilicus. It was thought to be a recurrence in the other ovary, but proved to be a massive omental metastasis, with extensive nodular metastases throughout the peritoneal cavity. The only interpretation of this tumor which seems rational is that it is a carcinoma mucocellulare of teratomatous origin, the mucocellular elements being derived from entodermic epithelium, just as we believe that the ordinary benign pseudomucinous cystadenoma arises from entodermic elements in a teratoma which have blotted out and overgrown other original constituents of the teratoma.—Ed.)

## OVARIAN DYSGERMINOMA

ALF SJÖVALL

*Acta obst. et gynec. Scandinav.*, 23: 585-603, 1943

The clinical and pathological characteristics of ovarian dysgerminoma are described in connection with 7 cases. All the patients were young; one was 28 years and the rest 10 to 17 years of age. In 2 cases the uterus was respectively hypoplastic and anaplastic; in all the others it was normally developed. The 28 year old patient had borne 2 children. All the tumors except 2, the diagnosis of which rested on torsion of the pedicle, were large (1 to 4½ kg.). In one case

early and presumably highly favorable cases rapid recurrence may occur, while in the occasional case an apparent cure will follow operation in cases which on the basis of common experience should be considered as practically hopeless from a prognostic standpoint. Whether the factors concerned pertain to some unexplainable regression of the tumor cells or, which may be essentially the same thing, some unknown body defensive mechanism, we can only speculate.

Both the clinician and the pathologist may have difficulty in deciding as to whether the adenocarcinoma of the endometrium or that of the ovary is the primary lesion, when these two coexist. The relative size and advancement of the two lesions is not always a safe criterion for making the decision. The histological type of the growth often helps, as some carcinomas of the ovary are of a histological type not encountered in the endometrium. The reverse, however, is not often the case, for most forms of endometrial adenocarcinoma are not distinguishable from types of adenocarcinoma which occur primarily in the ovary. At times, however, one is apt to be influenced by special features. For example, adenocanthoma is rare in the ovary but fairly common in the uterus, so that one would be inclined to assume a primary uterine origin when coexisting uterine and ovarian lesions of this type are encountered. Even this criterion, however, is not infallible, as a number of adenocanthomas of the ovary have recently been reported as arising in the walls of endometrial cysts (Kuzma, Novak, Teilum), with no associated uterine carcinoma.

The clinician himself will naturally find it far more difficult to make the distinction, though the history will at times furnish helpful clues. I have recently seen a patient of 55, with a history of uterine bleeding for 1½ years, and with a uterus enlarged to the size of a three months' pregnancy, but of irregular knobby contour, suggesting myoma in association with the uterine adenocarcinoma revealed by curettage. About six weeks after intracavitary radiation, operation revealed that the supposed myoma was a moderate-sized left ovarian carcinoma intimately welded to the posterior surface of the uterus. Since primary carcinoma of the ovary in itself rarely produces uterine bleeding, and since this patient had had bleeding for 1½ years, there seemed to be little doubt that the uterus was the primary site. A good deal of clinical and pathological detective work is often necessary to decide such questions, and even then one will be doubtful in some cases as to whether the tumor is primarily uterine or ovarian.—Ed.)

## A UNILATERAL KRUKENBERG TUMOUR WITH NO APPARENT PRIMARY GROWTH

DOREEN DALEY

Proc. Roy. Soc. Med., 39: 769, 1946

The patient, aged 39 years, was first seen because of retrosternal pain of several months' duration, not related to food and worse on bending. No abnormality was found; a barium series, chest x-ray and E. C. G. were negative. She was next seen 9 months later when a hard mobile mass was felt in the right lower abdomen rising from the pelvis almost to the umbilicus. The patient had had 3 months of amenorrhea following a regular menstrual cycle.

Laparotomy revealed a firm tumor of the right ovary which was removed. Other pelvic organs were normal and there was no ascites. Section of the tumor showed firm, almost white tissue with some areas of degeneration near the hilum. Histologically it was a typical Krukenberg carcinoma.

Further investigation failed to show any primary growth. Fractional test

(While a number of cases have been reported in which pregnancy occurred in the later history of women in whom granulosa cell tumors had been removed, I do not recall any in which pregnancy followed reoperation for a recurrent tumor of this type, though there is no especial reason why this could not follow in either case. The special feature of this report is the conservatism displayed by the authors in simply resecting the original tumor without the total removal of the adnexa on the involved side, as I feel sure that most of us would have done, especially with a good ovary on the other side.

To most of us this will seem like carrying conservatism too far. There is general agreement that in young women in whom the preservation of the reproductive function is important, unilateral removal of the adnexa is as a rule reasonably safe. But there are exceptions, for recurrence may take place after such conservative operations, just as it may take place after even radical removal of the uterus, with both tubes and ovaries. It is important to remember that recurrence or metastasis of granulosa cell tumors may at times not occur until many years (in one case eighteen) after the original operation. If the case reported in the above paper is a fairly recent one, it may be suggested that the patient is not yet completely out of the woods.—Ed.)

## THECA-LUTEIN TUMOUR

W. HAWKSWORTH

Proc. Roy. Soc. Med., 39: 769-770, 1946

The author discusses the theca-cell tumor, or thecoma, particularly in respect to its microscopic picture. The tumor commonly occurs in the postmenopausal age-group, is nearly always unilateral and produces hormonal effects similar to those observed in cases of granulosa-cell tumor. The microscopic picture is not uniform. Classically, the cellular elements are described in 3 main groups: (a) the cell type which resembles the cellular elements of the theca interna of the maturing graafian follicle, where the cells are slender, spindle-shaped, with fibrous projections, elongated, deeply-staining nuclei and scanty protoplasm containing minute lipid droplets; (b) cells similar to the theca interna as they appear immediately prior to rupture of the follicle, that is, ovoid or plump cells with atrophic fibrillary processes, roundish or ovoid nuclei and abundant fat-laden protoplasm; or (c) cells which resemble the theca-cells after rupture of the follicle, i.e., theca-lutein cells; these are polyhedral in shape, show no evidence of fibrillary projections, have central nuclei and abundant lipid in the protoplasm.

The histogenesis of the tumor is probably best considered as arising from remnants of early mesenchymal cells, as postulated particularly by Novak and Barzilai. Its symptomatology is due to the fact that it produces the female sex hormone. As a rule, the tumor is benign, but examples of proved malignancy have been found. In treatment, removal of the tumor is adequate, except in cases of malignancy where panhysterectomy should be followed by deep x-ray therapy.

This tumor was removed from a 62 year old woman whose complaint was a blood-stained discharge for the past 2 months. Curettage revealed a hyper-

the tumor was irremovable at exploratory laparotomy, but could be removed after radiation. Five other cases were surgically treated. Two died with metastases in the abdomen, one of these having metastases in the skull, spine and pelvis as well. The others are alive and healthy, two after more than 20 and 30 years, respectively. 2 figures.

(All the patients in this series were young, and this is characteristic of dysgerminoma, so that it has at times been spoken of as "carcinoma puellarum". It is of interest to note that 2 of the 7 died of metastases, while 5 have remained well. Statistics on the incidence of recurrence and metastasis with this tumor type are still rather meagre, but something like 25 per cent would probably be a fair estimate. Dysgerminoma is therefore much less malignant than the ordinary types of ovarian carcinoma, but these tumors are nevertheless not to be taken as lightly as some are inclined to do. When they are small and well-encapsulated, even unilateral adnexal removal is usually followed by cure, but when they are larger, or when they break through their capsules and become infiltrative, complete removal is likely to be difficult or impossible, and recurrence is common.—Ed.)

## GRANULOSA CELL TUMOR AND CONSECUTIVE PREGNANCY

A. PERALTA RAMOS AND A. G. PERALTA RAMOS, JR.

Bol. Soc. Obst. y Ginec. de Buenos Aires, 25: 216-226, 1946

The authors report an interesting case of granulosa cell tumor of the ovary with subsequent pregnancy following its removal.

A 28-year-old woman, single, was operated upon for a tumor presenting in the right adnexa and uterine bleeding. Biopsy of endometrium revealed a proliferative mucous membrane with no signs of hyperplasia. On laparotomy, a tumor the size of a pigeon egg was encountered in the right ovary, the left ovary being normal. A partial resection of the right ovary, including the tumor, was performed, followed by uneventful recovery. Pathological examination of the specimen showed it to be a granulosa cell tumor of the folliculoid type. Menstruation again became normal, but 5 months later it started to be scanty and to last longer. A premenstrual titre of estrogens in the urine (24 hrs) revealed 150 R. U., after which the patient was put on chorionic gonadotrophic and pituitary hormone therapy. Several months later, the right ovary was found to be again enlarged, and therefore another laparotomy was performed. A solid tumor was found in the right ovary, whereas the left one was cystic and slightly enlarged. The operation consisted of right oophoro-salpingectomy and a partial resection of the left ovary. Pathological examination revealed granulosa cell tumor in the right ovary and lutein formation (lutein cyst?) in the left.

The patient later married and 10 months afterward (2 years and 9 months following the second operation) had a full term normal pregnancy, which was followed by a second one 2 months and a half later, both showing a normal course.

This case illustrates and justifies the employment of conservative surgical procedures in young women presenting granulosa cell tumor of the ovary.

(The reason given by the authors for their preference for the designation "fibrothecoma" is not a good one. It is true that thecal cells are of fibrous tissue nature, but they have certain special characteristics, not the least of which is the physiological one of producing estrogen. By the same token the cells of granulosa cell tumors are epithelial, but we would not wish to speak of granulosal tumors as merely epitheliomas. The so-called thecosis described by Fraenkel must still, it seems to me, be a rather questionable lesion, and one which is as yet scarcely to be considered an established clinical or pathological entity.—Ed.)

## CYSTADENOCARCINOMA OF LEFT OVARY

H. ULFELDER, T. B. MALLORY AND M. K. BARTLETT

New England J. Med., 235: 833-834, 1946

A 51 year old housewife was admitted to the hospital because of pain in the left lower quadrant of the abdomen and a mucosanguineous vaginal discharge. The patient was in the midst of the menopause. The cervix was large, with nabothian cysts and a rough granular area on the right posterior lip. An irregular, hard mass, felt in the region of the fundus, seemed to project more to the left than to the right. A vaginal smear was reported positive for tumor cells. Biopsy of several areas of the cervix showed chronic endocervicitis.

Dr. Ulfelder states that cancer cannot be excluded in a patient of this or any age who has a bloody vaginal discharge, but if either endocervical or uterine cancer was present in this case, he thinks that it was incidental rather than the basis for the symptoms. His diagnoses are cystic tumor of the left ovary and possibly cancer of the endocervix or uterine fundus.

At operation a cyst of the left ovary was found which was lined with innumerable papillary projections. It is known that papillary cystic tumors of the ovary are at least potentially malignant. The epithelial cells showed evidence of rapid growth and considerable irregularity of staining, and the tumor was called a cystadenocarcinoma. There were small leiomyomas of the uterus, but no evidence of cancer.

(It is rather difficult to evaluate the above report on the basis of the reported preoperative and postoperative findings. The vaginal smear was reported as positive for tumor cells, presumably meaning cancer cells, but no cancer was found in either the cervix or corpus of the removed uterus. This suggests a misinterpretation of the smear, even though a cystadenocarcinoma of the ovary was revealed at operation. While no mention of diagnostic curettage is made in the abstract, I presume that this was done, since the patient had a bloody discharge, and the cervical biopsy was negative for carcinoma. The cystic ovarian tumor was "lined with innumerable papillary projections", referring presumably to the cystic cavity and not to the external surface. In the latter case one might conceivably recover cancer cells in the vaginal smear, though no such case has been reported, so far as I know. In a previous number of the Survey, I have suggested that the finding of definite cancer cells in the vaginal smear of a case in which thorough uterine curettage and cervical biopsy have eliminated uterine cancer might be of diagnostic value in the case of primary tubal carcinoma. While no such case has as yet been reported, I was interested to learn,

trophied endometrium, and a small left ovarian tumor was palpated. The uterus and tumor were removed vaginally and the patient recovered. The endometrium appeared slightly thickened and the myometrium did not show any macroscopic hyperplasia. The microscopic picture of the tumor resembled theca interna of a physiological graafian follicle prior to ovulation.

(To his enumeration of cell types found in thecomas, the author might have added that almost always one finds some cells of definitely granulosa morphology, or cells which, if not clearly epithelial, are at least "epithelioid". This is not surprising in view of the common origin of both the granulosa cell tumor and the thecoma from the progranulosa and prothecal elements of the early ovarian mesenchyme.—Ed.)

## FIBROTHECOMA OF THE OVARY

R. S. FERRACANI, N. A. PELLIZA AND E. G. BUR

Bol. Soc. Obst. y Ginec. de Buenos Aires, 25: 156-162, 1946

The authors prefer the name "fibrothecoma" because the theca cells of the normal ovary have more of the characteristics of connective tissue elements.

A case is presented of a 29-year-old woman, with menarche at the age of 11, presenting normal menstrual cycles. Following her last delivery, severe and intractable uterine bleeding appeared, which lasted for months. Various sorts of hormonal treatment and 2 curettages were done without success. With a diagnosis of uterine myomatosis and endometrial hyperplasia, a laparotomy was performed. A small, solid tumor was encountered in the right ovary, which was removed together with a portion of the ovary. The uterine cavity was opened and curetted. A small nodule of myoma was resected from the isthmic portion of the uterine wall. Pathological examination revealed fibrothecoma of the ovary, endometrial hyperplasia and a nodule of myoma. The fibrothecoma showed no histological signs of malignancy, and its architecture resembled very closely the adult theca interna.

Uneventful recovery followed the operation. The menstrual cycle returned to normal and four months later the patient became pregnant, with abortion after 3 months.

The symptomatology of these tumors is quite typical—metrorrhagia accompanied by myo-endometrial hypertrophy before or beyond the menopause, believed to be due to excessive secretion of estrogens. However, Fraenkel has lately called attention to cases of amenorrhea and masculinization occurring in women with diffuse hyperplasia of the theca cells (thecomatosis, thecosis or hyperthecosis), which would inhibit follicles and corpora lutea and, thereby, the hormonal secretions. The symptomatology disappears with the removal of the "tumor".

Though the prognosis of thecoma itself is benign, not infrequently the endometrial hyperplasia caused by excessive estrogenic stimuli becomes neoplastic. Treatment should be surgical, and whenever possible, confined to the tumor zone. Roentgen therapy would be of no value in tissues highly differentiated.



days before admission, but these irregularities do not surpass those frequently occurring in menarche.

(The distinctions of terminology emphasized by the authors in the last paragraph of the above abstract are confusing, and, I believe, incorrect. They obviously mean to distinguish between cystadenomas, which are genuinely neoplastic, but which we all include in the clinical designation of ovarian cysts, and, on the other hand, the non-neoplastic cysts of retention variety, including the follicular and lutein groups. The latter are usually small, transitory, with no capacity for continued autonomic growth, and, contrary to what the authors say, they usually show very little or no endocrine activity. The follicle cysts, for example, represent merely atretic, blighted and waterlogged follicles. They tend toward spontaneous resorption, though they may become as large as a lemon or even larger, and occasionally are of clinical importance, as when they undergo torsion of the pedicle.

This simple variety of cyst cannot as a rule be distinguished by palpation from the smaller cystadenomas, and hence one should refrain from operating on small ovarian cystic masses. An examination a few weeks later will often show them to have completely disappeared. As a matter of fact, there are some women in whom such small cysts periodically come and go, sometimes alternating between the two ovaries, as the late Emil Ries of Chicago pointed out many years ago.

When, on the other hand, periodic examinations show that the cystic mass, instead of diminishing or disappearing, grows steadily larger and larger, one can be certain of its neoplastic nature and operative removal is indicated.—Ed.)

## GANGRENOUS OVARIAN CYST IN A CHILD OF FOUR, AND RUPTURE OF THE HEART

E. R. SELBY

Canad. M. A. J., 56: 74-75, 1947

Two cases are presented in this paper, the first of which describes ovarian cyst in a child 4 years of age. This patient had been in excellent health until the onset of distress high in the abdomen, nausea and vomiting. When seen 4 days after the initial onset of symptoms she appeared contented, had no pain, took fluids freely, but refused food. Examination was negative except for slight resistance in the right mid-rectus area. The temperature was 100.8, pulse 96. The following night she had abdominal pain and when seen the next day there was definite resistance in the region of the right mid-rectus. She was admitted to the hospital.

On admission the temperature was 101.2, pulse 114, white blood cells 20,300; polymorphonuclears 73 per cent. Five hours later the latter 2 findings were 23,000 and 83 per cent, respectively. At laparotomy the appendix was found inflamed and was removed. Adhesions extended across the entire pelvis. Exploration of these revealed a gangrenous cyst of the left ovary with 2 complete rotations in its pedicle. It contained fragments of 7 teeth, bone and sebaceous material. The right ovary showed no suggestion of cyst formation. Recovery was uneventful.

during a recent visit to New Orleans, that exactly this procedure was recently applied in a recent case by one of the local gynecologists, who expects to report his observation in the near future.—Ed.)

## SEROUS CYSTOMA OF THE OVARY IN YOUTH AND OLD AGE

PEARL M. STETTLE, MOOREHEAD AND W. SCHILLER

J. Am. M. Women's Ass., 1: 216, 1946

Two case reports, with pathological discussion, are presented because of their similarity in 2 individuals with a difference of more than one-half century in age.

The first case is that of 15 year old girl whose only complaint was an asymptomatic enlargement of the abdomen and hips over a period of 3 months. All physical findings were normal except for the abdominal and pelvic. A non-tender, hard, tense mass was palpated reaching from the symphysis almost to the costal margins. It was dull to percussion, and a fluid wave was present. The hemoglobin was 70 per cent; erythrocytes, 3,750,000; leucocytes, 7550; with normal differential. At laparotomy an 8-pound, 4-ounce cyst of the left ovary was removed. The right ovary was enlarged and contained numerous small cysts. The left ovarian cyst proved to be a primary multilocular, secondary unilocular, serous cystoma.

In the second case a 71 year old woman was admitted complaining of abdominal pain and swelling, gradually increasing over a period of 3 months, and "gas pains" and constipation during the same period. She had vomited intermittently and had had no bowel movement for 3 days. She had passed a small amount of dark blood vaginally 4 days prior to admission. Physical findings were essentially normal except for a markedly distended abdomen which made bimanual pelvic examination non-revealing. Percussion was dull except in the right flank where it was tympanitic. A fluid wave was detected. The hemoglobin was 68 per cent; erythrocytes, 3,100,000; leucocytes, 10,400 with 70 per cent polymorphonuclears. Laparotomy revealed a small amount of blood-tinged fluid in the peritoneal cavity, and a 14-pound cyst of the right ovary with twisted pedicle. The wall of the serous cystoma (primary multilocular, secondary unilocular) was gangrenous as were the uterus and right salpinx.

Both of the tumors are cystomas, or genuine neoplasms, and not cysts, as evidenced by their size. Also, cysts continue the endocrine function of the organ they developed from, by producing hormones, which may interfere with regular menstruation. Ovarian cystomas do not produce hormones and thus do not interfere with menstruation. The 15 year old patient had had 3 menstrual periods preceding admission which were about 6 days early with the flow slightly less than normal. She had missed the period which had been due 10

the right sided leg pain was due to any ureteral involvement, and the surgeon apparently thought this unlikely. However, such radiation of pain to the lower extremities is not uncommon with ureteral lesions, even such simple ones as stricture.

Endometriosis of the extreme type described in this patient often causes marked intestinal infiltration which can be readily mistaken for carcinoma. If the pelvic organs are the seat of advanced endometriosis, as in this case, the endometriotic nature of the intestinal lesion can usually be safely assumed, and this naturally leads to a much more conservative plan of treatment than if one were dealing with cancer. If there have been no obstructive lesions, colostomy should be avoided, as the bowel lesion will retrogress after removal of all ovarian tissue, or, if this is technically impossible, subsequent adequate radiation. In this case no obstructive symptoms are described in the abstract, and yet colostomy was done. If the reason for this was a purely prophylactic one I believe the procedure was unnecessary.

A great many instances of intestinal endometriosis have been reported in recent years, and some of these publications have been commented upon in previous numbers of the Survey (Thierstein and Allen, *Am. J. Obst. & Gynec.*, 51: 635, 1946, abstract and comment, Survey 1: 580, 1946; Wood, Deibert and Kain, *J. A. M. A.*, 130: 341, 1946, abstract and comment, Survey 1: 410, 1946).—Ed.)

## ENDOMETRIOSIS OF EXTRA-GENITAL LOCALIZATION

C. CORREA DA COSTA

*Obstetricia y Ginecologia Latino-Americanas*, 4: 387-409, 1946

The author discusses the histogenesis of adenomyosis and endometriosis, quoting the various theories supported by Meyer, Novak, Sampson, Halban and others.

Adenomyosis is explained, according to Cullen and Frankl's theory, as the result of the proliferating capacity of the endometrium to invade the myometrium. As to endometriosis, the main objection raised against Sampson's theory, viz., that menstrual endometrium is incapable of growing, cannot stand any longer, since Cron and Gey were able to obtain growth of menstrual endometrial particles in cultures. This shows that the latter have the capacity of implanting themselves and growing. Therefore, endometriosis can be explained in the following manner: the product of menstrual exfoliation may reach the peritoneum through the tubes, and, on the other hand, invade the blood vessels and lymphatics which have become patent during menstruation, destroy their walls, thus explaining the peritoneal and extragenital localizations of the disease.

The author reports 2 cases of endometriosis of the umbilicus, one of the laparotomy scar (post-cesarean) and one of adenomyoma of the round ligament.

Over a period of 10 years (1934-1944), among 2285 clinical observations there were 33 cases (1.44%) of endometriosis seen at the Gynecological Service of the Fundação Gaffree-Guinle, Rio de Janeiro (Brazil), with the following distribution: 3 in the uterine body (endometriosis interna); 7 in corporeal myoma; 10 tubal; 8 ovarian; 2 in the round ligament; 2 in the umbilicus; and one in a laparotomy scar.

(This was probably an easy diagnosis to miss, as even if rectal examination was made, as it probably was, such a cyst might well have been riding too high to have been felt through a tense abdominal wall. However, it is well to remember that ovarian cysts may occasionally occur in children, and that these are not infrequently of dermoid type.—Ed.)

## ENDOMETRIOSIS

M. K. BARTLETT, T. B. MALLORY AND F. M. INGERSOLL

New England J. Med., 235: 801-803, 1946

A 34 year old unmarried woman was admitted because of severe pain in the right leg. Six months before admission the patient had been operated on because of prolonged, excessive vaginal bleeding of 2 months' duration; there had been 3 episodes of severe lower abdominal pain during this period. Both tubes and bloody cysts of both ovaries were removed. Fifteen days after operation a sudden, severe right-sided pain had occurred, after which the pain had been constant. It ran from the hip into the right leg, down to the heel and sometimes up the spine. It was worse at the time of the menstrual periods. There was no intermenstrual bleeding; the periods were regular and extremely painful.

Examination revealed tenderness and voluntary spasm in the left lower abdominal quadrant. The right leg was slightly weaker than the left and straight-leg raising was limited to 45 degrees on that side. The cervix was large and soft, and the uterus was partially fixed and enlarged. Movement of the cervix and the uterus caused severe pain. Rectal examination revealed a hard mass to the left of the cervix and uterus. X-ray studies of the chest, spine and kidneys were negative. In the intravenous pyelogram the lower ureters diverged somewhat laterally, and there was pressure on the superior margin of the bladder.

The ovarian cysts removed at the previous operation probably were not malignant, or simple removal of the cysts and tubes would not have been the extent of the operative procedure. Dr. Bartlett considers that the right-sided leg and back pain was probably not due to a lesion in the pelvis, in view of its sudden onset. There is no way to rule out malignancy, although the patient's age is somewhat against it. Dr. Bartlett's diagnosis was endometriosis, in view of the patient's age, nulliparity and menstrual difficulties.

At operation the surgeon found what would best be called a "frozen pelvis". Behind the sigmoid on the left side there was a cystic mass and the sigmoid mesentery formed one of its walls. Three holes were made in the sigmoid during the difficult process of freeing it. The uterus and remnants of ovaries were removed, and a colostomy was performed. The specimen showed extensive endometriosis of the 2 ovaries and of the posterior surface of the uterus.

(The case reported is one of extensive pelvic endometriosis, with such involvement of the sigmoid that it was damaged at operation, and with apparently also impingement on the lower urinary tracts. The data included in the abstract are not sufficient to indicate that

would seem best explainable on the basis of hematogenous transportation of such tissue from the uterus, though this involves the difficult assumption that such transported cells run the gauntlet of the pulmonary capillary system. The other hypothesis, suggested by the author, that of embryonal displacement, cannot be eliminated from consideration. There is no doubt that particles of endometrium may occasionally find their way into the uterine veins, and much more frequently into the lymphatics. I have in quite a number of instances seen such endometrial emboli in the lymphatics, and it was such observations as this that led the late Josef Halban to formulate his lymphogenic theory for the etiology of pelvic endometriosis in general. There are rather obvious reasons, such as the inability of this theory to explain the usual distribution of pelvic endometriosis, why it has never received any measure of support.—Ed.)

## PRIMARY CARCINOMA OF THE FALLOPIAN TUBE; A REPORT OF FOUR CASES

G. BANCROFT-LIVINGSTON

J. Obst. & Gynaec. Brit. Emp., 53: 453-460, 1946

The author presents 4 cases of carcinoma of the Fallopian tube and reviews the literature. Two of the 4 cases presented occurred at the Middlesex Hospital and are the only cases known to have occurred there during the past 25 years, the total number of gynecological patients admitted being 9881. The ages of these patients were 48, 38, 60 and 49 years, respectively. The presenting complaints, in the same order, were: painless swelling of the abdomen; heavy and irregular periods for one year with back pain at time of periods for 10 months; continuous vaginal hemorrhage for 18 months with severe backache for one year; and continuous pain in the iliac fossa for 6 months with 2 recent small postmenopausal losses of blood. A correct clinical diagnosis was not made in any of these 4 cases.

From the recent literature, the author has studied 33 reported cases. Of these, only 2 were correctly diagnosed preoperatively. The physical signs of this condition are seldom characteristic. The triad of lower abdominal pain, watery or bloodstained vaginal discharge and a lateral pelvic mass should arouse suspicion of tubal malignancy. Of the 33 patients reviewed, 11 had abdominal pain, 9 had vaginal discharge, 8 had postmenopausal bleeding, and a mass was present in 21. The condition should be borne in mind more frequently by the clinician, and doubtful cases in which symptoms persist after palliative treatment should be subjected to laparotomy.

Total hysterectomy and bilateral salpingo-oophorectomy is concluded to be the best plan of treatment. The value of deep x-ray therapy is at best doubtful, as might be expected from the histological nature of the growth. However, sufficient cases have not been treated and followed for final conclusions to be drawn in this respect. The prognosis, whatever the treatment, is poor. Ten of the 33 cases collected from the literature had deep x-radiotherapy, and of these 5 were alive at periods varying from 6 months to 4 years, and 5 had died.

(It seems incredible that only 33 instances of endometriosis were encountered among a total of 2285 gynecological cases, especially since the diagnosis of endometriosis included also the uterine form, most frequently designated as adenomyosis. Only 8 instances of ovarian endometriosis were noted, and there can be very little doubt that aberrant endometrium must have very frequently been missed in the pathological examination.—Ed.)

## ECTOPIC ENDOMETRIAL TISSUE IN THE THIGH

C. P. SCHLICKE

J. A. M. A., 132: 445-446, 1946

A 35 year old Filipino woman entered the hospital complaining of a tumor on the posterior aspect of her left thigh. Three years previously she had begun to suffer from pain and tenderness in a circumscribed area on the thigh during her menstrual periods. Soon a small lump was noted in the affected area, and this steadily increased in size; the pain and tenderness continued to be accentuated at the menstrual periods, and the patient noted that the lump was larger then than during the remainder of the cycle. Pelvic examination revealed a rather large but normally situated and freely movable fundus and normal adnexa. In the posterior midline of the left thigh there was a deep seated, hard, tender tumor about the size of a golf ball which moved with the surrounding tissues but was not adherent to the skin.

At operation the tumor, which was stony hard, appeared to arise from or in the deep fascia of the thigh. It was intimately adherent to the surrounding tissues and exhibited no well defined capsule or zone of demarcation. The tumor was removed with a one centimeter cuff of fascia and adherent tissue, and the patient recovered uneventfully.

Microscopic examination of the tumor revealed numerous epithelium lined glandular acini containing blood cells and cellular debris. The glands were separated by a loose fibrous stroma. Both the glands and stroma resembled those of a functioning endometrium. It was believed that it was heterotopic endometrial tissue.

Cullen has satisfactorily explained the derivation of the glandular tissue in adenomyoma of the uterus. Sampson's implantation theory lends itself well to accounting for chocolate cysts of the ovary and adenomatous islands on the peritoneal surfaces of the pelvic structures. Lesions such as that noted in the writer's patient are probably best explained by entry of endometrial fragments into the blood stream, although some prefer to regard them as embryonal displacements. In this patient the history of periodic swelling, pain and tenderness concurrent with menstruation suggests that her tumor responded to endocrine stimulation. 3 figures.

(The occurrence of what is apparently typical endometrial tissue in the thigh, together with previous reports of aberrant endometrium in other bizarre locations, such as the arm,

peritoneal cavity, fallopian tube and a postoperative wound abscess. The writers suggest that the lungs were the primary focus of infection in this case. Sulfadiazine was given to the patient, but the pulmonary infection was unaffected. She was not given streptomycin, but Herrell and Nichols reported 4 cases of ozena due to this bacillus in which symptoms were relieved by intramuscular streptomycin. 2 figures.

## PENICILLIN VIA FALLOPIAN TUBES

A. R. FRISK AND A. WESTMAN

Lancet, 2: 118-119, 1946

The authors have studied the penicillin concentrations in the blood and urine after intramuscular and intratubal administration. The results show that when penicillin is administered by instillation into the tubes, the absorption is only insignificantly lower than after intramuscular injection. When equal doses are given in all cases, a mean of 61 per cent is recovered in the urine after intramuscular injection, the corresponding figure for intratubal administration being 51 per cent. Penicillin is absorbed more slowly when it is given through the tubes than when injected intramuscularly. Consequently the concentrations in the blood become smaller and a longer time elapses before the excretion by the kidney is completed. After intramuscular injection 90 per cent of the total amount of penicillin recovered from the urine was excreted within 2 hours; after 4 hours excretion was nearly complete. On the other hand, when penicillin was introduced by way of the tubes, only 62 per cent of the recovered quantity was excreted in 2 hours, and penicillin could be detected in the urine after 10 hours.

The practical consequence of instillation of 20,000 units of penicillin into the tubes every twelfth hour is that a high bacteriostatic concentration can be continually maintained in the tubes and the lower part of the peritoneal cavity. This form of treatment may perhaps prove valuable in salpingitis, which is otherwise difficult to combat.

(I rather think that the reaction of most gynecologists to the idea of injecting penicillin into presumably acutely infected tubes is that the method is probably not without hazard and that it smacks of meddlesome gynecology. The intramuscular method, on the whole, gives satisfactory results and is certainly far safer.—Ed.)

Of the 23 cases treated by surgery alone, 6 were alive for periods varying from one month to 15 years, 7 had died, and in 10 the end result was not stated. 5 figures.

(The report of even 4 cases of primary tubal carcinoma is a fairly generous contribution to the literature, in view of the extreme rarity of this neoplasm. Two of them were observed among a total of 9881 gynecological patients and this sparse incidence accords with that in other clinics, including our own. The extremely unfavorable prognosis is probably in large part explained by the insidious clinical course, as in most cases of ovarian carcinoma. The latter, as a matter of fact, is at least much more apt to produce a lower abdominal swelling which attracts the attention of the patient, this being often her first warning that something is wrong, though usually it comes too late. On the other hand, postmenopausal bleeding is much more common with tubal than with ovarian carcinoma.

Even when postmenopausal bleeding is associated with an adnexal mass, one is much more likely to think of tumors of the ovary rather than of the tube. Thus one is not likely to think of salpingography, which has been recommended as an aid to the diagnosis of tubal carcinoma. The same is true as regards the vaginal smear, which ought to reveal cancer cells. As a matter of fact, it would be likely to be of more value with tubal than with uterine cancer, since the tubal disease is not accessible to preoperative biopsy. I do not believe that thus far there is any report of the employment of vaginal smear diagnosis in a case of tubal carcinoma.

Most cases come to operation in late stages of the disease, and the surgeon should be familiar with the gross appearance, which is quite characteristic. Usually in these late stages the tubes are greatly enlarged, and often of sausage-like appearance. Unlike the ordinary pyosalpinx, the carcinomatous tube is often quite free and non-adherent, and may present a smooth glistening surface. If cut across, its lumen may be full of a finely papillary, partly necrotic material, as tubal carcinoma has a characteristic tendency to concentric growth into the lumen, with little or no penetration of the tubal muscular wall.

The earlier cases are more difficult to diagnose at operation, with perhaps only a small localized growth in a tube which may be essentially normal or which may be the seat of a chronic inflammatory process, making detection of the carcinoma all the more difficult before microscopic examination is done.

The earliest case in the literature was the lucky accidental find of Mitchell and Mohler, reported in 1945, who discovered a tiny but very typical primary carcinoma on routine microscopic examination of the little loop of a grossly normal tube resected for sterilization purposes. The prognosis in this case should be good, as she subsequently had a radical operation. Dr. Mohler told me some months ago that she had thus far shown no sign of recurrence (Mitchell and Mohler, *Amer. J. Obst. & Gyn.*, 50: 283, 1945. Abstract and comment in *Survey* 1: 127, 1946).—Ed.)

## ACUTE SALPINGITIS DUE TO FRIEDLÄNDER'S BACILLUS; REPORT OF A CASE

T. W. BOTSFORD AND T. D. KINNEY

*New England J. Med.*, 235: 539-541, 1946

A case of acute salpingitis due to Friedländer's bacillus which occurred in an 80 year old woman is reported. The patient was treated by salpingectomy, with recovery. A Type A Friedländer's bacillus was recovered from the sputum,



INFECTION OF THE URINARY TRACT IN THE FEMALE  
DUE TO *TRICHOMONAS VAGINALIS*

B. WILLIAMS

Brit. J. Urol., 18: 63-65, 1946

Fourteen cases of urinary infection in the female due to *Trichomonas vaginalis* are reported. The oldest patient was 27, and 6 were 20 or under. Six patients were married, and in one case the symptoms began immediately after marriage. In most cases the symptoms were those of urgency and frequency, of scalding or burning pain on micturition, and of a sensation of bladder fullness after micturition. In 5 cases there was evidence of spread to the upper urinary tract, with rigors, pain in the loin and temperature up to 103 degrees. In several cases there were signs of salpingitis and pelvic peritonitis. In every case *Trichomonas vaginalis* was found in wet swabs taken from the vaginal wall or fornices, usually with ease and in large numbers. A few cases showed the obvious local characteristics of trichomonas infection of the vagina.

In one case a few active parasites were found in a catheter specimen, but immediate examination of the urinary deposit in a wet state was not carried out routinely.

The urinary symptoms usually subsided quickly with rest, ample fluids and alkalis, and in a few cases the administration of sulfonilamide or sulfathiazole. Local vaginal treatment was given, but bladder lavage was not used.

It is considered that *Trichomonas vaginalis* was responsible for these urinary infections, in view of the presence of a trichomonas infection of the vagina or vulva, the improvement of urinary symptoms with the subsidence of this infection, and the absence of any other etiological factor. It is probable that immediate examination of wet urinary deposits would have shown this organism in more cases had it been done routinely, and this method of investigation is worth carrying out in all cases of urinary infection.

The writer considers it probable that *Trichomonas vaginalis* is the most frequent and important cause of urinary infection in the young female. Increasing recognition of this possibility should lead to correct diagnosis and proper treatment in many more cases than is found at present.

(While trichomonas infection of the urinary tract undoubtedly occurs, and while it is probably more frequent than published reports would indicate, I believe that most gynecologists and urologists would doubt that it is the "most frequent and important cause of urinary infection in the young female."—Ed.)

## FEMALE UROLOGY

### THE FEMALE URETHRA

H. G. HANLEY, H. P. WINSBURY-WHITE AND C. MORSON

Brit. J. Urol., 18: 76-79, 1946

This discussion on the female urethra and its relation to upper urinary tract infections took place in the Section of Urology of the Royal Society of Medicine. H. G. Hanley opened with a paper containing clinical data that had been derived from 433 women of childbearing age who had complained of urethral symptoms. From a consideration of the findings in this group of women, this writer thought that the theory of ascending infection has as much clinical evidence in its favor as any other, probably more. He found that the sexual organs were related to the pathology in the urinary tract. In his opinion there was a close relationship between erosion of the cervix and urethritis.

H. P. Winsbury-White referred to the experiments of Helmholtz at the Mayo Clinic which might be profitably followed in early cases of kidney pain. If the urethra were investigated in all such cases, and in some a lesion was found, the treatment of which alleviated the renal symptom, it was a reasonable conclusion that there was a urethral change to which the renal lesion owed its origin. On the other hand, there were many cases with upper urinary tract symptoms which had resulted from urethro-trigonitis where treatment of the lower urinary tract had little or no effect on the kidney symptoms, probably because the renal changes were too advanced. This writer went on to discuss the treatment of the urethral foci by urethral dilatation, adding that fulguration of urethral polypi was essential in certain cases. He believed that the benefit from dilatation was derived from promoting drainage from the foci of infection.

C. Morson said that Mottram's experiments gave direct evidence that a lesion of the bowel would cause *B. coli* pyelitis. Radium was put into the large bowel in sufficient dose to destroy the goblet cells which secrete mucin. When these goblet cells were destroyed the *B. coli* could be seen in the section passing along the lymphatics, outside the lumen of the bowel, to the kidney. The same thing happened in constipation. Hanley said that he did not believe in this theory.

(This is an interesting three-cornered discussion of the routes of urinary tract infection, Hanley and Winsbury-White stressing the importance of the ascending route, while Morson apparently holds to the more generally accepted concept that most urinary tract infections tend to follow the descending route. The evidence adduced by the first two does not seem impressive or convincing. On the other hand, the experiment described by Morson is an interesting one, supporting the view that pyelitis may be caused by lymphatic transportation of *B. coli* through the wall of the large bowel, as in those cases in which pyelitis appears to be clinically associated with constipation.—Ed.)

RESECTION OF THE BLADDER NECK IN THE FEMALE,  
WITH REPORT OF A CASE

B. MELVILLE

Australian &amp; New Zealand J. Surg., 15: 299-303, 1946

Contraction of the bladder neck is diagnosed on the following evidence: (a) extreme urinary difficulty; (b) retention of a large amount of residual urine, especially if supported by evidence of back-pressure on the bladder. If neurological examination excludes the diagnosis of neurogenic bladder, Thompson then proceeds to a modified excision of the bladder neck, employing the Thompson cold-punch resectoscope. The author presents a case which constitutes an excellent example of the condition and its treatment.

A single, 57 year old woman, a *virgo intacta*, neurologically normal, presented a condition causing great difficulty in urination. There was a high amount of residual urine and evidence of back-pressure in the bladder. At operation the 27 French gauge Thompson cold-punch resectoscope was introduced. A chronic granular urethritis was present. The bladder neck showed nothing of note except a slight ridge across the floor. The entire circumference of the internal meatus was resected so that a perfectly round orifice resulted. The residual urine was checked and the patient now voids freely and easily. The microscopic picture of the fragments of tissue removed closely resembles that of many urethral caruncles. 3 figures.

(It looks as if the prostatectomists, with their resectoscopes, might be planning to invade the field of female urology. The operation suggested by Melville appears to be a rather heroic one for the condition described, evidently a chronic granular trigonitis and urethritis.—Ed.)

## PENICILLIN FOR GONORRHOEA IN THE FEMALE

W. N. MASCALL

Lancet, 2: 712-714, 1946

The author has analysed 39 consecutive cases of gonorrhea in the female treated with penicillin, in amounts generally considered more than adequate, and of the 39 cases, 24 did not respond to treatment. Penicillin was administered in the following 4 different schemes of treatment:

- (1) Multiple injections of an aqueous solution in divided doses totalling 150,000 units or 300,000 units.
- (2) Single injection of 200,000 units in aqueous solution.
- (3) Single injection of 150,000 or 200,000 units in arachis oil and beeswax.
- (4) Patients with syphilis also were given 60 injections totalling 2,400,000 units.

Of the 39 patients 12 had gonorrhea and syphilis and were admitted to the hospital where they were treated according to treatment scheme (4). Of these 12 patients 5 showed signs of active gonorrhea, with positive tests, after discharge.

The series included 3 children with vulvovaginitis. In the author's experience this type of case has responded poorly to penicillin. One child, aged 4 years, improved after receiving 16 g. of sulfathiazole, followed by clinical and bacteriological relapse. Penicillin, 150,000 units in divided dosage, and later 300,000 units of penicillin in divided dosage were given. Tests were still positive, and a further injection of 250,000 units in arachis oil and beeswax was followed by relapse. A course of sulfadiazine was then given, with subsequent negative findings. The other 2 cases of vulvovaginitis cleared with sulfonamides after unsuccessful penicillin treatment.

Reports which have been published claiming 90 per cent or more of successes in removing gonococci from secretions and resolving the clinical signs of gonorrhea are not confirmed by the present study. The writer warns against the indiscriminate use of penicillin without proper investigation of the patient. Successful penicillin therapy depends upon a correct diagnosis, adequate dosage and prolonged observation after treatment. The cases in the present series which received 2,400,000 units of penicillin suggest the possibility that some strains of gonococci have a natural or acquired resistance.

(An increasing number of reports of this rather pessimistic tone have somewhat dampened the enthusiasm engendered by the spectacular effectiveness of penicillin indicated in most of the earlier reports. It already seems clear that certain strains of gonococci are penicillin resistant, and others appear to become so after initially inadequate treatment. In view of the intensive studies of penicillin now being made in so many laboratories and clinics, we should be able to evaluate it a bit more clearly within the next year or two, although it has of course already established itself as a sort of wonder drug in the treatment of gonorrhea.—Ed.)

vaginal group. In the total abdominal hysterectomies there were 65 cases comprising 60.7 per cent of the total morbidity in this group without apparent cause. In the supravaginal group there were 3 cases of unexplained morbidity. Urinary infection accounted for 81 per cent of the high morbidity in the vaginal hysterectomy group. In 7 cases there was no apparent cause for fever.

There was one death (0.15 per cent) in the entire series. This followed unsuspected, massive intraperitoneal hemorrhage from the abdominal wall after total hysterectomy.

(See comment on succeeding abstract of paper by Masani.—Ed.)

## HYSTERECTOMY

K. M. MASANI

Indian Physician, 5: 190-199, 1946

The writer discusses a series of 206 hysterectomies, of which 135 were abdominal and 71 were vaginal.

*Abdominal Hysterectomies:* The primary indications for operation in the group of 135 abdominal hysterectomies were as follows: fibromyoma, 72 cases; functional uterine bleeding, 11 cases; chronic endometritis and chronic metritis, 4 cases; carcinoma of the corpus uteri, 5 cases; carcinoma of the cervix, 6 cases; sarcoma of the uterus, 2 cases; vesicular mole and chorionepithelioma, 4 cases; hematometra, one case; interstitial pregnancy, one case; placental polypus, one case; and adenomyosis, one case.

Twenty-seven of the abdominal hysterectomies were performed secondarily during operation for diseases of the tubes and ovaries. In 6 cases hysterectomy was done secondarily during the removal of ovarian cysts; in 3 of these carcinoma of the ovary was suspected. In 3 cases there was a preoperative diagnosis of ovarian carcinoma and the uterus was removed. In 18 cases of chronic salpingo-oophoritis the uterus was removed either because both appendages required removal or because of dense adhesions.

In this group of 135 abdominal hysterectomies there were 13 deaths, a percentage of 9.6. Eight of these deaths occurred in cases where hysterectomy was associated with other complicating factors.

*Vaginal Hysterectomies:* All of the indications for vaginal hysterectomy were primary. In the presence of complicating factors it is much better to do an abdominal operation and, after exploration, to decide the exact nature of operation. Prolapse of the uterus was the indication in 27 cases. In 17 there was 3rd degree prolapse; in the remaining cases the prolapse was of 1st or 2nd degree. In deciding hysterectomy, 4 associated factors were taken into consideration: (1) menstrual irregularity; (2) elongation of cervix; (3) erosion and ulceration of cervix; and (4) degree of cystocele.

Twenty-nine of the vaginal hysterectomies were indicated because of functional hemorrhage. The majority of these cases of hemorrhage were in women

## OPERATIVE GYNECOLOGY

### HYSTERECTOMY; A STUDY OF 607 CASES

C. H. TYRONE, C. G. COLLINS, J. C. WEED, R. F. ZEIGLER, JR. AND  
J. B. CRAWFORD

Southern M. J., 39: 957-960, 1946

This paper consists of a study of 607 cases of hysterectomy. The writers prefer the total operation to the subtotal procedure; there were in this series 478 total abdominal, 29 subtotal and 100 vaginal hysterectomies.

As to symptomatology, multiplicity of complaints was the rule. Vaginal discharge was recorded in 90.8 per cent of the total abdominal group, in 91 per cent of the vaginal group and in 52 per cent of the subtotal group. Pelvic pain or pressure and backache were prominent symptoms and occurred in about an equal percentage in all groups. Dysmenorrhea was significantly present in those requiring the abdominal route, but was not prominent in the vaginal group. Hypermenorrhea and polymenorrhea were a more prominent feature in those cases necessitating the abdominal operation. Postmenopausal bleeding occurred about equally in all groups. Symptoms related to pelvic relaxation and child-birth injury were most conspicuous in those cases suitable for the vaginal approach.

The patients' ages ranged from 26 to 80, the largest number of cases falling in the groups between 36 and 50 years. Beyond the age of 50, the vaginal approach was employed progressively more often. The incidence of absolute sterility in cases subjected to total hysterectomy (27.8 per cent) was amazing. The absolute sterility in the other groups was in accord with expectations.

In 50 cases in the entire series (8.2 per cent) malignancy was encountered. The separate percentages were 9.2 for the total abdominal group, 6.9 for the subtotal group and 4 for the vaginal group. A total of 269 cases (44 per cent) of leiomyomas was encountered in the series. This incidence, which is lower than that of other reported series, may be explained by the fact that this series was comprised totally of white women. In 4.5 per cent of cases leiomyomas were associated with malignancies of the genital organs. In 34 per cent of cases of fibromyomas, adenomyosis or endometriosis was demonstrable. Endometriosis constituted more than 20 per cent of the principal pathologic lesions; this high incidence suggests that the condition is frequently overlooked. Chronic cervicitis and endocervicitis were reported in every cervix that was studied. Pelvic inflammatory disease was reported in only 72 cases, but 88 patients had previously had either unilateral or bilateral salpingectomy.

The standard used for morbidity was a temperature of 100.4 degrees F. for 2 consecutive days. The total operative morbidity was 22.4 per cent in the total abdominal group, 20.7 per cent in the subtotal group and 56 per cent in the

startling in this day and generation, especially when there is so much stress laid upon the pre-operative preparation of patients, and when such measures as transfusion are so readily available to lessen the risk. It is difficult to understand why 1 of every 7 abdominal hysterectomy patients should exhibit postoperative shock, even if an inordinate proportion of them were of the more difficult type. It is indelicate and probably unfair to say so, but one would get the impression by comparing these two reports that hysterectomy is a far safer procedure in America than it is in India.—Ed.)

## SURGICAL TREATMENT OF DYSMENORRHEA

C. J. DUNCAN

New York State J. Med., 46: 2757-2759, 1946

Painful menstruation divides itself into 2 main groups: the essential, unassociated with demonstrable pelvic pathology; and the secondary, in which some organic reason for the pain can be found.

In the group of essential cases the gynecologist is faced with a very serious responsibility in suggesting surgery, and operative intervention should not be advised without careful consideration. However, surgical intervention should be considered in any girl totally incapacitated for 24 hours or longer when the difficulty has been present a year or more.

The time-honored first measure in these cases, particularly when the patient is under 20, is a thorough dilatation and curettage. Section of the superior hypogastric plexus has, in recent years, been employed frequently for the severe essential cases with dramatic results. At the Free Hospital for Women, Brookline, Massachusetts, it is felt that dilatation and curettage with suspension combined with a presacral neurectomy give somewhat better results than does presacral section alone. The author describes the operative technique. An incision is made into the posterior parietal peritoneum over the promontory and is extended upward to the bifurcation of the aorta and downward to the midsacral segment. The lateral limits of dissection are ureter on the right and common iliac vein on the left. All tissue down to the periosteum of the promontory is grasped and tied with chromic catgut. The dissection is then carried up to the bifurcation and down to the midsacral level, completely removing all tissue in this area. Care must be taken not to leave nerve fibers under the peritoneal reflections. Signs which indicate that a successful outcome may be expected are vaginal staining within a few days after operation and the possibility of introducing a uterine sound into the fundus 4 to 6 weeks after operation without undue pain.

From 1941 through 1944 there were 53 cases of essential dysmenorrhea with sufficient follow-up to be reported. Of these, 46 (86.8 per cent) had total relief; 3 (5.6 per cent) had partial relief; and 4 (7.5 per cent) were listed as failures.

The 2 most frequently encountered causes of secondary dysmenorrhea are endometriosis and pelvic inflammation. In the younger group of patients secondary dysmenorrhea may be treated conservatively, with a high expectation of secondary surgery. In women over 35, endometriosis should be treated radi-

between 35 and 40 years of age, and 26 of the 29 patients had had from 2 to 8 full term deliveries.

There were 6 cases in which uterine malignancy was diagnosed preoperatively, of which 2 cases proved to be carcinoma of the cervix and one, adenocarcinoma of the body. Fibromyoma was the indication in 4 cases; the size of the uterus in these cases was not larger than a 10 weeks' pregnancy. In 4 cases chronic metritis served as indication for operation. In one case hysterectomy was done for secondary hemorrhage after curettage—the curettage had caused damage of the uterine wall in one place, and a vein had been opened.

The Mayo-Ward operation is considered by the author to be a very satisfactory procedure for complete procidentia in women nearing the menopause. The Schauta operation, with sufficient practice and proper selection of cases, is very satisfactory for carcinoma of the cervix.

Postoperative shock in the abdominal hysterectomy cases was 14.8 per cent, compared to only 4.2 per cent in the vaginal cases. However, several of the abdominal cases had associated complications. Urinary complications were 32.6 per cent in abdominal cases and 19.7 per cent in vaginal cases. Gastro-intestinal complications were 22.2 per cent and 18.3 per cent, respectively, and respiratory complications were 14.8 per cent and 5.6 per cent, respectively.

In both the abdominal and vaginal operations, the writer prefers total hysterectomy to the subtotal procedure.

(This paper and the one abstracted above, are interesting studies in contrast. Masani reports the very high mortality rate of 9.6 per cent in his 135 abdominal hysterectomies, far larger than would seem justifiable in this day and generation. This, too, in spite of the fact that the indications given for these operations appear to be about like those encountered in most clinics, though there might have been unusual operative problems which are not evident from a mere enumeration of these indications. The mortality for the vaginal hysterectomies is not given.

By contrast, Tyrone and his associates report a far larger series with a mortality rate of 0.15 per cent, which is certainly much better than the average of even very good clinics. The series, moreover, includes 50 cases of malignant disease, in which it may be assumed that at least some of the operations were of more than average scope.

On the other hand, the morbidity rates, especially in the vaginal hysterectomy group, are better for the Indian clinic than in those from New Orleans, Masani reporting only 19.7 per cent of urinary complications, while Tyrone and his associates found them to constitute 81 per cent of the 56 per cent of morbidity in the vaginal series. What such wide variations signify is not apparent, except it be the frequent unreliability of statistical studies in general.

Masani's indications for vaginal hysterectomy will not impress everyone as sound. To the large number of gynecologists who prefer some such procedure as the Manchester-Fothergill type of operation in most prolapse cases, the mere existence of elongation, erosion or ulceration of the cervix will not appeal as contraindications, since such conditions are readily taken care of by cervical amputation, which is or should be a part of most such operations in women beyond the childbearing age. When vaginal hysterectomy is for any reason indicated in cases of prolapse with cystocele, I agree that the procedure alluded to by such designations as the Mayo-Ward, Mayo-Simpson and Goffe operation is a very satisfactory one, though one should always combine with it proper care of the posterior segment to prevent the subsequent occurrence of vaginal enterocele, which I think is the chief postoperative hazard of vaginal hysterectomy in general.

Finally, the high incidence of postoperative shock in Masani's series appears rather



from 3 to 5 months in order to notice activity from the grafting, and it may last for 2 or 5 years, and sometimes even more.

In order to control the activity of the graft, the author advises the use of biopsies of the vagina, vaginal smears, pH determinations, and whenever possible, hormonal assays.

The author reports the case of a 33-year-old woman who had been submitted to total hysterectomy and bilateral salpingo-oophorectomy 2 years previously. The patient presented severe menopausal symptoms, and following 2 courses of estrogenic therapy, she was submitted to the homoplastic endometrium-ovarian graft, as described above. The results were very good following the operation and still persist well after more than 5 years. The endocrine activity of the grafts has been demonstrated by vaginal biopsies and smears, as well as by pH determinations.

(This procedure impresses me as a very irrational one in this day and generation, certainly from the standpoint of trying to supply the woman with the ovarian hormones through ovarian grafting. There might have been some extenuation for ovarian implantation in a former day, when the ovarian hormones were still unknown. If there is any advantage of ovarian grafting to the simple oral administration of estrogens I do not know it. As a matter of fact, the experience of past investigators has been that only autoimplants (utilizing the woman's own ovarian tissue), are likely to take, while homoimplantation (same species) is rarely of value, and heteroimplantation (from another species) is sure to be unsuccessful. This, at any rate, was the conclusion of the late Franklin Martin, with whom the study of this question was almost a life-long hobby.

One must be equally skeptical as to the value of combining endometrial implantation with that of ovarian tissue. Such endometrial implantation was practiced in a few German clinics before the war, but it seems to be not without some hazard, especially as to limiting the extension of the graft if it takes.

While there is little doubt that there is some sort of reciprocal coordination between the endometrium and the ovaries, it is the absence of ovarian estrogen after surgical castration which is responsible for vasomotor symptoms, as with the natural menopause. Furthermore, the symptoms are in the majority of cases not enough of a problem to call for any estrogenic therapy at all. If Dutra believes that endometrial implantation should accompany ovarian grafting in the surgical menopause, I wonder if he recommends it also in the estrogenic treatment of the symptoms of the normal menopause.—Ed.)

## SURGICAL TREATMENT OF THE SEVERE ANOMALIES OF THE GENITAL CYCLE

J. A. SALABER, A. E. NOGUES AND J. M. E. MEZZADRA

Bol. Soc. Obst. y Ginec. de Buenos Aires, 25: 167-186, 1946

The authors report the results achieved in 28 cases of micro-polycystic ovaries associated with prolonged disorders of the genital cycle (oligomenorrhea, amenorrhea, metropathia hemorrhagica, accompanied by genital hypoplasia with or without obesity and hypertrichosis) treated by cuneiform resection of both ovaries, thus removing from  $\frac{2}{3}$  to  $\frac{3}{4}$  parts of the ovarian cortex.

According to the symptomatology, the cases were grouped as follows: primary

cally, that is, by total hysterectomy and bilateral salpingo-oophorectomy, to insure the best results. It is the writer's belief that surgical measures either should not be resorted to at all, or, if they are, should be sufficiently adequate to assure permanent relief.

The effects of presacral sympathectomy in these secondary cases is discussed. In 33 cases this operation was done for acquired dysmenorrhea. Total relief was obtained in 10 cases (30.3 per cent); partial relief in 8 (24.2 per cent); and 15 were total failures (45.5 per cent). This percentage of failures is very high but is about what may be expected.

(I am not sure how many will agree with the author's statement that "surgical intervention should be considered in any girl totally incapacitated for 24 hours or longer when the difficulty has been present a year or more", or that the "first measure in these cases, particularly when the patient is under 20, is a thorough dilatation and curettage." The subject of dysmenorrhea is too big a one to embark on here, but there are certainly lots of things that can be done for such cases other than surgery, and these often keep the dysmenorrheic patient reasonably comfortable. This is not to say that surgery is not justified in at least a proportion of cases, those of unusually severe and intractable type which have not responded to simpler measures. Presacral neurectomy certainly has its place, but it is reasonably sure that any gynecologist who does a large number of these each year is not taking full advantage of other methods of treatment. The operation is an abdominal one, and it is far from infallible in its results, not everyone having as high a percentage of total relief as that reported by the author.

When severe dysmenorrhea is associated with such conditions as endometriosis, pelvic inflammation or marked retroflexion, I believe it to be often a good plan to include presacral neurectomy with the other procedures that may be indicated, as one cannot be sure that the latter will give satisfactory relief from the dysmenorrhea, so that the firing of a double-barreled gun seems rational. In my own practice more presacral neurectomies are done in these combined cases than for the relief of primary dysmenorrhea *per se*.—Ed.)

## HOMOPLASTIC OVARIAN AND ENDOMETRIAL GRAFT IN THE TREATMENT OF SURGICAL MEONOPAUSE

LICINIO H. DUTRA

An. Bras. Ginec. Vol. 20, No. 5, November, 1945

A study is made of the so-called functional endometrium-ovarian synergy and the disturbances caused by surgical castration. For the latter, i.e., in the treatment of the artificial menopause, surgical or radiotherapeutic, in women during the sexual phase of life, the author advocates the use of a homoplastic endometrium-ovarian graft. This will bring back the normal endocrine balance and, therefore, release the symptoms brought forth by castration.

The grafts ought to be obtained from young patients submitted to operation for benign disease, in whom different blood-tests for syphilis, RH factor, etc. must be previously done. The author uses 2 small particles of ovary and 2 of endometrium, which are placed respectively in the subcutaneous tissue of the labia majora and of the inguinal regions. Whenever possible, grafting should take place as soon as the material is obtained from the donor. It usually takes

terocele with intestinal loops. The cervix was situated immediately below the symphysis pubis and could be drawn just outside the vulva. The anterior fornix was normal, the posterior completely effaced. At operation the posterior vaginal wall was resected and the enterocele opened. The body of the uterus was turned out. Reposition of the intestine contained in the prolapse was performed. The hernial sac of the enterocele was resected and the peritoneum sutured. Reposition of the rectocele was done. The uterine body was then fixed in the levator slit to the levators with one suture on each side and one in the middle of the fundus. A Sturmdorf amputation of the cervix and colpoperineorrhaphy were done. Examination of this patient 2 years after operation showed an excellent result. On bearing down there was only slight bulging of the posterior vaginal wall.

A similar technic was used in the second case (73 years old) with complete genital prolapse and prolapse of the rectum (after previous operation for carcinoma recti). In this case the uterine body was turned backwards into the levator slit in extreme retroversion and sewn to the levator muscles. The uterine body was covered with the flaps of the resected posterior vaginal wall. The hypertrophic cervix was amputated after reposition of the bladder, and the cervical stump fixed supporting the bladder with sutures to the periosteal tissue on both sides. Thus, the uterus was turned upside down, forming the centre of the reconstructed pelvic floor. The result was good and lasting at examination 4 months after operation.

In neither of these cases did the extreme retroversion give rise to any complaints afterward. 10 figures.

(This procedure for the correction of pelvic enterocele is a rather ingenious one, and, so far as I know, had not been previously described. It would seem unnecessary in the case of enteroceles of moderate size, where the neck of the peritoneal sac is apt to be rather narrow. Such hernias are readily amenable to the ordinary procedure of resecting the sac after preliminary ligation of its sac, with obliteration of the cul-de-sac by a purse-string suture including the uterosacral ligaments. However, in the case of large and wide-necked sacs the procedure described by Sjövall of buttressing the posterior pelvic segment with the body of the uterus would seem to be a rational one, although it should be combined, it seems to me, with the older plan of obliterating the cul-de-sac as well as possible.—Ed.)

## A CONTRIBUTION TO THE OPERATIVE TECHNIQUE OF VESICO-VAGINAL FISTULA; SIPPEL-AHLSTRÖM'S "BALL-WIRE" METHOD APPLIED TO OPERATION PER VAGINAM

ALF SJÖVALL

Acta obst. et gynec. Scandinav., 25: 385-391, 1946

Sippel-Ahlström's "ball-wire" method to operate upon vesicovaginal fistula by the abdominal approach has been worked out for operation per vaginam. By this method a series of wooden balls of graduated size are threaded on a thick

amenorrhea (one case), secondary amenorrhea (2 cases), oligomenorrhea (3 cases), metropathia hemorrhagica (20 cases), sterility (11 cases), patients with androtrichosis (12 cases).

In such cases the ovaries are much larger than the average size (ovaries of Bartel-Herrmann), whitish, with abundant edematous stroma and several small cysts located in the cortex. The ovarian capsule is usually thickened. On cross section, many follicular cysts are seen, but, on the contrary, fresh lutein tissue is exceptionally visualised. According to their gross appearance, the authors divide these ovaries in 2 groups: a) with abundant stroma and follicle cysts located at the periphery; b) the cysts occupy the whole organ. In the small follicles, generally one finds microscopically large cells greatly increased in number in the theca interna layer. This constitutes the so-called thecal hyperplasia, which can occur in either diffuse or circumscribed form, and is often related to the androtrichosis presented by such patients.

The following results were observed: (a) The 3 cases of amenorrhea were cured (100%); (2) The 3 patients with oligomenorrhea were also cured of this symptom (100%); (3) From the 20 cases with metropathia hemorrhagica (17 showing endometrial hyperplasia) 16 (80%) were cured, whereas the remaining 20% showed recurrences of the disease in 3, 12 and 15 months therefrom; (4) In the 10 sterility cases, pregnancy occurred in 50%; (5) The androtrichosis observed in 12 patients was not improved in any.

The authors, therefore, advocate such treatment for patients presenting the syndrome above described and in whom hormonal treatment has completely failed.

(The procedure recommended by the authors is essentially the same as that recommended by Irving F. Stein whose article (*Am. J. Obst. & Gynec.*, 50:385, 1945) was abstracted and commented upon in the *Survey* 1:152 (Feb.), 1946. However, the indications for the operation in the cases reported by them are far wider than those of Stein, who recommends it for what he considers a definite syndrome characterized by menstrual irregularity, especially amenorrhea, with sterility, sometimes retarded breast development and obesity. (See comment on abstract of Stein's paper.)—Ed.)

## INTERPOSITIO UTERI RECTOVAGINALIS, AND A SIMILAR PROCEDURE IN THE OPERATIVE TREATMENT OF CERTAIN CASES OF GENITAL PROLAPSE

ALF SJÖVALL

*Acta obst. et gynec. Scandinav.*, 26: 311-320, 1946

In cases with very large prolapse of the posterior vaginal wall (large rectocele and/or enterocele) and only slight lowering of the anterior vaginal wall, *recto-vaginal* interposition is an excellent method of operation. Two cases are presented with descriptions and illustrations of operative technic.

The first patient was 70 years old. The entire posterior vaginal wall bulged out of the vulva. The prolapse contained a large rectocele and over it an en-

suture is fastened to the anterior lip of the cervix and the ends of the suture drawn through the hole in the speculum and tied tightly to its handle. The speculum is then pressed against the posterior vaginal wall. The writer finds this arrangement satisfactory for exposing the field of operation. 2 figures.

(This simple but rather clever little procedure might well be useful in the occasional case of the type described by the author. To judge from this, and from the other two papers by the same author abstracted above, one would have the impression that our Scandinavian colleagues must have a whole bagful of surgical tricks of one sort or another at their disposal.—Ed.)

## THE USE OF PENICILLIN IN REPAIR OF COMPLETE PERINEAL LACERATIONS

G. JOHNSON

*Am. J. Obst. & Gynec.*, 53: 82-83, 1947

The writer reports 4 cases of complete perineal laceration in which penicillin was given after the repair operation as a routine procedure. Its use seemed a definite advantage. All patients received the same preoperative preparation and the same type of operation. Postoperatively, 10,000 units of penicillin were given intramuscularly every 3 hours. The average hospital stay for these 4 patients was 12 days. The highest temperature charted was 100.4 degrees F. One patient had a fair result and the remaining 3 had excellent results. The writer describes the operative technic employed.

silk thread. The wire is passed from the vagina, where a ball stops, through the fistula up into the bladder which is exposed through a supra-pubic incision. In this way a ball of sufficient size is stopped at the vaginal fistular mouth. The fistula can then be drawn forward toward the abdominal wound for dissection of the fistular cuff. The vaginal end of the thread is then provided with a clamp which invaginates the cuff, a purse string suture being tied at the same moment as the clamp is allowed to loose its grip and the ball wire disappears from the bladder. The fistula is closed. This method may be used in those cases where it is impossible to apply a dissection handle directly or through the cystoscope according to the technic previously described by the author (Sjövall, A.: *Acta obst. et gynec. Scandinav.*, 1944: 24: 165).

In a case presented in this paper, the fistula could not be seen through the cystoscope; thus, it was impossible to pass a catheter through it via the bladder. However, a small crater was observed on vaginal examination. Through this a fine probe was passed, and its tip could be seen through the cystoscope. The "ball-wire" procedure was applied, and when drawn forward by the ball, the fistula showed itself to be larger than expected. A metal wire was drawn through the fistula with the thread and balls, thus providing a handle which greatly facilitated operation. A purse string suture was inserted in the fistular cuff, and operation was completed with a longitudinal row of interrupted buried catgut sutures and a similar row in the transverse incision in the vaginal mucous membrane. Seven months after operation the patient was absolutely continent.

The vaginal "ball-wire" method may be used in very small fistulae and such with a diameter up to one cm. It guarantees an easy and simple operation, thus giving the best chance for healing. 9 figures.

(I venture to say that few American gynecologists have ever heard of the Sippel-Ahlström "ball-wire" method for the closure of certain vesico-vaginal fistulas. While this procedure, involving opening the bladder from above, is certainly not necessary for the closure of most fistulas, including most of those high up in the vaginal vault, it embodies an ingenious idea which might be profitably utilized in the occasional case.—Ed.)

### A SIMPLE ARRANGEMENT TO FACILITATE CERTAIN OPERATIONS UPON THE ANTERIOR VAGINAL WALL AND UNDERLYING STRUCTURES

ALF SJÖVALL

*Acta obst. et gynec. Scandinav.*, 25: 528-530, 1946

In such operations as those for urinary incontinence and cystocele, when the portio vaginalis cannot be drawn outside the vulvar opening, good exposure and sufficient tension of the anterior vaginal wall may be obtained in the following manner. A hole is bored in the apex of a long bladed vaginal retractor. A long

if we are told, as we are in this study, that the increase is 10 or 12 fold over that seen in the postmenstrual and premenstrual periods. Again, we have long accepted that the viscosity decreases at midcycle, making the mucus more easily permeable to the spermatozoa. But this fact seems more impressive when we are told that at the ovulation phase the rate of travel of the spermatozoa is as much as 3 mm. per minute, as against .25 mm. or less at other phases.—Ed.)

## THE OFFICE STUDY OF INFERTILITY

I. M. PROCTOR AND K. DICKINSON

Am. J. Obst. & Gynec., 53: 65-74, 1947

This study is based on a series of 210 unselected cases of infertility studied by all available means in an effort to determine what we have to offer the woman complaining of infertility for any reason whatsoever, and how many of them will eventually succeed in producing normal, viable offspring.

Fifty-three per cent of infertile women will seek advice within one to 5 years of married life. On the other hand, 63 per cent of the women who subsequently became pregnant had consulted physicians by the time they were married 5 years or sooner, seeming to confirm the impression that the longstanding, untreated case has the least satisfactory response when treatment is undertaken. Of the 210 women studied, 153 had had no previous pregnancies; 49 had had previous pregnancies.

Mechanical and chemical factors were studied by the following means: (1) history; (2) chemical tests such as use of indicators in vagina and cervix; (3) detailed examination of reproductive tract such as use of sound, observation of cervix and its secretions; (4) palpation of uterus and, sometimes, of tubes; (5) Huhner test; (6) tubal insufflation; (7) lipiodol and x-ray studies of tubes and uterus.

From the history it is difficult to evaluate the part played by previous significant diseases, with the exception of gonorrhea. There was a relatively high incidence of surgical manipulations, particularly in patients with longstanding sterility. None of 4 cases with a history of ruptured appendix became pregnant, and none of 14 patients who had worn a stem pessary became pregnant or had a history of pregnancy.

Vaginal secretions were tested in 103 cases and were found acid in all. The pH of the cervical canal was tested in 101 cases; it was alkaline in 52 cases and acid in 49. In this latter respect, no difference was noted in the cases which became pregnant and those who did not. In 123 cases (59 per cent) there existed outstanding cervical pathology, a most impressive figure.

In 42 cases (20 per cent) a retroflexed uterus was found; this is approximately the incidence among all women. However, in the cases which became pregnant, only 11 per cent had a uterine retroflexion.

The Huhner sperm test was recorded 104 times, and was considered normal in

## STERILITY

### CYCLIC CHANGES IN THE PHYSICAL AND CHEMICAL PROPERTIES OF CERVICAL MUCUS

W. T. POMMERENKE

*Am. J. Obst. & Gynec.*, 52: 1023-1031, 1946

Young healthy women who had normal menstrual cycles and normal pelvic findings served as subjects for the present study. Basal temperature records of all subjects showed a typical midcycle shift from a lower to a higher level. Cervical mucus was collected throughout the cycle by aspiration from the external os and from the cervical canal. An effort was made to obtain all mucus available at any one time.

It was observed that the maximal production of mucus occurs on about the 14th day of the usual 28-day cycle, there being at that time a ten- to twelvefold increase over the 20 to 60 mg. quantity present in the postmenstrual and premenstrual periods. The maximal mucus secretion was noted to occur in the 2-day period during which the basal temperature rise takes place.

The viscosity of cervical mucus decreases at midcycle; the lowest viscosity occurs at the time of ovulation coincident with the basal temperature shift. At midcycle, when the viscosity is lowest, spermatozoa may travel through the cervical mucus at a rate of 3 mm. or more per minute. Before and after the ovulatory phase their progress through the mucus may be reduced to less than 0.25 mm. per minute.

The water content of cervical mucus in the postovulatory and preovulatory phases ranges from 92 to 94 per cent. At midcycle it rises to 97 to 98 per cent. At midcycle the mucus is translucent and relatively acellular.

Furthermore, it was found that at midcycle the cervical mucus is well supplied with carbohydrate, and presumably with amino acids. Other workers have called attention to the importance of glycogen in the nutrition of the egg before and after fertilization and after nidation, and to the importance of sugar in the metabolism of human spermatozoa.

From a teleologic standpoint, the author concludes that because of the characteristics of cervical mucus observed in this study the sperm, on deposition in the vagina, find an environment propitious for their nutrition and migration through the cervical canal. 1 figure.

(This is only one of a number of studies which have been published by Pommerenke and his coworker, Viergiver, on cyclic and other variations in the cervical mucus. The present study confirms the results previously reported by Séguy and his collaborators (*Gynéc. et obst.*, 28: 657, 1933 and 27: 346, 1933) and Samar, Shettles and Delfs (*Amer. J. Physiol.*, 129: 234, 1940), but in addition embodies quantitative studies of the variations in the cervical mucus. For example, it is of interest to know that there is an increased production of mucus at the ovulation phase, but this fact is brought home to us much more forcefully



Smith-Hodge pessary.....	12	"	6	"
Knee-chest.....	10	"	5	"
Artificial insemination.....	1	"	0	"

In all of these patients other methods of treatment were employed.

Tubal insufflation was employed therapeutically 113 times.

Sixty-one cases received thyroid extract; 36 per cent of these became pregnant and, in all cases who became pregnant, 30 per cent received thyroid. The writers are convinced that this drug is an excellent one in the treatment of infertility. The estrogens, progesterones and gonadotropes were used in 22 cases, but their use was essentially empirical and the results cannot be evaluated.

There is a record of 73 pregnancies in this series of 210 cases (35 per cent). Living babies have resulted in 53 cases (25 per cent). Abortions and miscarriages have occurred in 9 cases and ectopic pregnancy in one case; there is no record of outcome in 3 cases, and 7 are now pregnant. From this study, the authors conclude that one of each 4 women who complain of infertility will succeed in producing a normal viable offspring under treatment as they employ it.

(The outline of office study in cases of infertility, as given by the authors, embodies the essentials. If one follows some such comparatively simple plan as this, there need be little fear that the more elaborate rituals outlined by some authors would yield an appreciably larger proportion of successes. There will of course be differing degrees of accent by different gynecologists upon the relative importance of various factors, based chiefly, no doubt, on their individual experiences. No very striking departures from common experience seem to be revealed by the study of the authors' group of cases.

The writers' conviction that thyroid therapy is often of great value agrees with that of most of us, although its employment in many cases is on an empiric basis. The thyroid undoubtedly has some influence on gonadal function, but very little is known as to the exact nature of this relationship, or as to whether it is a direct one or one mediated through the hypophysis. The not infrequent successes from thyroid administration in cases where there seems to be no hormonal abnormality would make one think that it may in some way have an improving effect upon the germ plasm of the sex cells, though I know of no scientific support for this view.

Like many other gynecologists I see many cases which have already been studied in other clinics, often so thoroughly that one in advance feels rather pessimistic as to being of great help to the patient. If there is any one factor more than any other which has seemed to have been overlooked in such cases it is this very factor of thyroid therapy in the case of the husband. In the wife this is not likely to have been neglected. Even in ostensibly normal men, with normal semen findings, and even in those in whom laboratory studies reveal no deficiency of thyroid function, the administration of modest doses of thyroid will at times yield success. A normal, motile spermatozoon is not always a potent one in so far as fertilizing capacity is concerned, just as the demonstration that a woman is ovulating does not necessarily mean that the extruded egg is capable of being fertilized. It is such considerations as these that incline one to believe that it may be along this line, that of improving the quality of the germ plasm of the sex cells, that thyroid exerts its beneficial effect in some cases. But, as already mentioned, this explanation is as yet purely speculative.—Ed.)

48 cases, abnormal in 56 cases. The condom-bottle sperm test was recorded 123 times, and was considered normal as to count, motility and morphology in 62 cases, abnormal in 61 cases. Sixty-five per cent of the husbands of the women who became pregnant had normal sperm, whereas only 44 per cent of the husbands of the women failing to become pregnant had normal sperm.

In this series of cases the "Rubin Test" was performed 306 times on 193 women. In the women who became pregnant, patency was demonstrated or achieved at the first trial in 67 per cent; in those who did not become pregnant, in 68 per cent. The test was performed twice in 62 cases; in the pregnant women patency was then demonstrated in 76 per cent, and in the nonpregnant in 71 per cent. There would thus appear to be about an equal incidence of the tubal factor in both groups. Two patients received the test 7 times each; one of these eventually became pregnant. Lipiodol studies were performed 17 times, and in the subsequently pregnant group demonstrated patency in 4 out of 5 cases. In one case the lipiodol showed occlusion, as in 3 Rubins, but pregnancy occurred anyway, demonstrating the occasional fallibility of these procedures.

Endocrine factors in infertility are demonstrated in office study on the basis of: (1) history; (2) physical findings; (3) basal metabolic rate; (4) endometrial biopsy. Nineteen cases complained of delayed onset of menstruation; 29 cases described menstrual irregularities. In all, 61 per cent of the present series showed endocrine stigmas of which the majority were ordinary obesity. Fibromyomas were encountered in 11 cases, of which only one patient became pregnant. Cystic ovaries were found in 17 cases; 29 per cent of these cases occurred in the group which became pregnant.

The basal metabolic rate was determined in 125 cases, and was normal ( $-10$  to  $+10$ ) in 74 cases. It was below normal in 46 cases and above normal in 5 cases. Therefore, 36 per cent of the group tested were clinically hypothyroids. Less than  $\frac{1}{2}$  of the cases of hypothyroidism became pregnant.

Endometrial biopsies were obtained by the aspiration curette in 135 cases. Ovulation was diagnosed in 87 of these, endometrial hyperplasia in 24 cases, endometrial hypoplasia in 11 cases and infection in 13 cases.

Attempts to overcome the various mechanical factors were as follows:

Cauterization of cervix.....	27 cases	13 pregnant
Conization of cervix.....	7 "	2 "
Amputation of cervix.....	16 "	6 "
Suspension of uterus.....	2 "	0 "
Curettage.....	2 "	1 "
Oophorectomy.....	4 "	
endometrioma.....	2 "	1 "
solid tumor.....	1 "	0 "
salpingo-oophoritis.....	1 "	0 "
Dilatation cervix.....	7 "	3 "
Vaginal plastic.....	1 "	1 "
Rock procedure (production of endometrial groove).....	1 "	1 "

have much time left to achieve their ambition, and most gynecologists would probably agree that earlier investigation is more advisable in this group than in the comparatively young group. While a year of trial appears to be that generally considered advisable, there are, and should be, frequent exceptions in either direction, depending on the individual circumstances surrounding each case.

Certainly every gynecologist will agree as to the wisdom of treating any evident endocrine disorder, such as hypothyroidism, or cervicitis, or of investigation of the masculine factor, should this be requested even very early in married life. The same statement can be made as regards simple pelvic examination of the wife. If these more obvious factors are found normal, he would probably counsel deferment of most of the other common sterility investigations, such as tubal insufflation or endometrial biopsy until a reasonable period, usually something like a year, has elapsed.

On the other hand, there is no doubt that a certain proportion of women let the golden moment slip by through too long delay in seeking investigation for sterility. The same statement applies even more forcibly to the large group of women who, for one reason or another, practice contraception during the early years of married life. They then decide that they would like to have a baby, but all too often get a rude jolt, through failure of the hoped for conception. Sometimes the investigation then invoked shows that they, or their husbands, have been sterile from the beginning of married life. Sometimes conditions have developed after marriage which impose absolute or relative sterility.—Ed.)

## A CASE OF STERILITY

EDITH JACOBSEN

Psychoanalyt. Quart., 15: 330-350, 1946

The case is discussed of a 35 year old woman who came to analysis in a state of acute neurotic depression. Her first account of the reasons for her depression was that during 10 years of marriage she had failed to become pregnant. After 2 years of regular periods, her menstruation had stopped at the age of 16 and for about 19 years she had been amenorrheic. Just before consulting the author she had attempted to adopt a child; the adoption agency had taken back the child because of her difficulties in adjustment.

Her physical appearance showed definite glandular disturbances; she was underweight, her figure boyish, breasts small and nipples inverted. Previous gynecologic examination had revealed a small and atrophic uterus, B. M. R. —20, and an atrophic endometrium. A gynecologist and internist had prescribed thyroid and an enriched diet to improve her general health.

After some months of psychoanalysis, the patient began to eat better and to gain weight. Her figure developed feminine contours, her breasts grew larger and the inverted nipples became normal. After 6 months of treatment the patient felt that she was ready to adopt another baby and contacted the agency. She was advised to wait until analysis was complete, or at least until its final stage. But in the eighth month of analysis she became pregnant without having previously menstruated. After an uneventful pregnancy she delivered a healthy baby. Analysis, although not complete, was interrupted shortly before delivery

## THE MANAGEMENT OF INFERTILITY OF SHORT DURATION

R. L. YOUNG

Rocky Mountain M. J., 43: 897-901, 1946

The author believes that insufficient attention is often given to patients complaining of sterility of short duration (8 to 10 months, for example), and that bland reassurance in such cases is not satisfactory, since approximately one couple in 8 eventually proves to be sterile. Therefore, an outline of preliminary studies is presented in this paper which will prevent the patient from receiving poorly considered treatment, frequently increase fertility, provide data for further complete study, should this be necessary, and select patients requiring complete study, thus saving valuable time. All of these procedures are inexpensive, may be accomplished rapidly and may be easily performed by the general practitioner.

A history and physical examination comprise the first step, with attention to general health. If evidences of endocrine abnormalities exist, consultation should be had with an endocrinologist. With the exception of thyroid, there is at present no hormone which is of routine value in treating sterility. However, one is justified in administering thyroid, even if no evidence of hypothyroidism exists.

Pelvic examination should include a search for obvious causes of infertility, with immediate treatment of cervicitis and endocervicitis. Congenital defects are treated at once; uterine retroversion is treated by advising the patient to lie on her abdomen for an hour following coitus.

Basal temperature graphs are helpful by demonstrating not only whether ovulation occurs, but also the exact time when it occurs. More elaborate tests to determine the occurrence of ovulation—endometrial biopsy and vaginal smears—are reserved for proved sterility cases.

The semen of the male partner should be examined for volume of ejaculate and the number, motility and morphology of spermatozoa. Should the study warrant it, the husband is referred to the urologist. Thyroid extract will frequently be of value.

In the author's hands, the precoital douche with Ringer's-glucose solution has offered sufficient promise to warrant its routine use in cases even of relative infertility.

The patient's problem should be explained to her, and she should be instructed as to the physiological mechanism of conception. An attempt should be made to evaluate the possible significance of psychogenic factors.

(It is really amazing to note the varying degrees of patience or impatience exhibited by different women at the failure of a much desired pregnancy to occur. There are some who begin to worry within a few months of marriage, while others just as anxious for children, keep persevering for years before seeking a study of their problem. It is easy to understand the impatience of women well in the thirties, who are apt to feel that they do not

## MISCELLANEOUS

### PELVIGRAPHY

D. JEFFERISS AND E. SAMUEL

Brit. J. Radiol., 19: 462-468, 1946

The writers present a radiological method for demonstrating changes in the female pelvic organs which essentially consists of the introduction of 20 to 30 cc. of a water soluble contrast medium through the fallopian tubes into the true pelvis. Thus, the generative organs and other soft tissue structures can be visualized as negative shadows in the dye-filled pelvis. The procedure causes little discomfort and can be used for investigation of gynecological conditions in out-patients. The contrast medium is rapidly absorbed and excreted so that there is little tendency for adhesions to form.

A catheter is inserted into the cervical canal and a mixture of 20 cc. pyelosil and 5 cc.  $\frac{1}{2}$  per cent novocaine is introduced. The novocaine renders the solution less hypertonic. Under fluoroscopic control, direct observation of the uterine cavity and patency of the fallopian tubes is obtained. Care must be taken that there is no reflux of the solution back past the catheter into the vagina. Films are taken demonstrating the filled lumen of the uterus and tubes. The remainder of the dye is then introduced and under screen control the filling of the true pelvis is observed. An anteroposterior film of the pelvis is taken, and then 2 films in both lateral positions. The authors' preliminary results were as follows:

Failure to pass catheter through cervical canal.....	3
Severe pain after introduction of pyelosil.....	1
Slight pain after introduction of pyelosil.....	2
Symptomless and successful peligrams.....	15
Total cases.....	21

In the present technique the dye generally runs into the dilated tube and mixes with the contained fluid in cases of hydrosalpinx, and by tilting the patient in various positions, the dye can be made to delineate the outline of the hydrosalpinx.

Early cystic dilatations of the ovary can be clearly seen. The ovarian tumor appears as a clear area with a thin line of dye around its surface. Displacement and thinning of the fallopian tube along the surface of the cyst helps to differentiate the condition from a coil of bowel.

The method claims no advantage over the conventional one for diagnosing tumors encroaching on the uterine cavity, but can demonstrate tumors arising from the peritoneal surface of the uterus, and possibly even pedunculated fibromata. It also demonstrates generalized thickening of the uterine wall.

Cysts and tumors of the broad ligament produce clear round areas which displace the uterine shadow and stretch the fallopian tube on the affected side. The dye generally forms a thin film over part of the surface of the cyst.

because the patient was too happy to feel need of further treatment. Some interviews since have helped her over current neurotic conflicts.

The patient was one of 8 children of a Jewish immigrant family. The period preceding her sixteenth year had been one of intense ambivalence toward her family. With the beginning of adolescence she felt a growing resentment because of the material and spiritual poverty of her home. Her inner protest found outlet in an affair with a Gentile boy with whom she eventually had intercourse. Her amenorrhea, which started soon after her first kissing experience with this boy is considered both an escape from femininity and being pregnant. Dieting developed into compulsive fasting—a self-inflicted punishment for her sexual “greed”. Her amenorrhea—at first certainly no more than a mild functional glandular disturbance—had specific symbolic meaning at first, but within a few years she acquired a severe polyglandular hormonal deficiency resulting in definite physical alterations. It is assumed that her endocrine functions were secondarily deficient because of her chronic anorexia nervosa and recovered after its successful treatment.

(I am afraid that the average gynecologist will be inclined to scoff at this report of psychosomatic cure of sterility in a patient who had not menstruated for 19 years, and who exhibited the other manifestations of sexual regression described by the author. Whatever one may think of the author's explanation of this case, there is no doubt that psychic factors may influence endocrine function very profoundly, and this statement applies to the ovaries and pituitary just as much as it does to the thyroid and the adrenals.

In the patient described in the report the psychotherapy was no doubt combined with constitutional measures, and these were no doubt of contributory value. The fact that pregnancy finally occurred without the re-inauguration of menstrual function is probably to be explained by the fact that the ovum given off at the first ovulation, which in the absence of insemination would have been followed by a menstrual period, was fertilized. A good many instances of pregnancy before the menarche have been observed, and I have encountered a good many cases in which pregnancy supervened during the currency of long-standing amenorrhea, of even a good many years' duration.—Ed.)

mains for those cases in which by somehow a clinical diagnosis is very difficult or even impossible to be established.

(There have been comparatively few reports concerning the employment of peritoneal pneumo-radiography in gynecology. It would seem to me that the indications for its use would be infrequent, although it is conceivable that in the occasional case it might be of diagnostic value. The evaluation of the present report must be tempered by the fact that in most of the cases the diagnosis had already been made by other methods, the pneumo-radiography being apparently employed for purposes of experimental study.—Ed.)

## THE SEX LIFE OF THE ADOLESCENT

IRENE SEBIRE

M. J. Australia, 2: 380-382, 1946

The author discusses the problems of adjustment in the adolescent, which involve emotional and intellectual processes as well as a biological one. His problem lies in making successful heterosexual adjustment in keeping with approved moral codes, and in achieving a personal standard of conduct which permits gratification in socially acceptable forms. He is unlikely to solve this problem adequately unless he is assured of appropriate sex education. Before reaching adolescence he should be well informed in the functioning of bodily systems, including the generative organs. Sex education, in its broader sense, should deal with the emotional and social implications of sex life as well as the physiology of sex and reproduction. Unfortunately, most parents are ill-equipped to impart such information and education to their children, and the majority of parents need help in developing an appropriate attitude themselves, before they can interpret the sexual function convincingly, and impart the necessary knowledge.

(While it is commonly emphasized that the parents are the ideal teachers of their youngsters in the facts of life, by whatever approach they deem appropriate with their particular children, the fact remains that this obligation is not very frequently or very satisfactorily carried out, often because the relations between parent and child are not sufficiently close and confidential to make the task an easy one. Again, all too often the parents are more in need of instruction than the children, and the latter are best reached indirectly by first instructing the parents as to the best methods of approaching the subject. Mass propaganda in sex hygiene has always seemed to me far less desirable than individual instruction, whether by the parent or by someone else, like an older brother or sister, or the family doctor.—Ed.)

The method may be used to demonstrate adhesions in the pelvis and around in ovarian fossa. In recent cases of pelvic inflammation the method is contraindicated, and it cannot be used where the fallopian tubes are blocked so that the dye cannot be introduced into the pelvis. 8 figures.

(While perhaps the chief indication for ordinary hysterosalpingography is furnished by cases in which there is a suspicion of tubal closure, the method described by the authors appears to be advocated for those in which the tubes are not blocked, so that the dye may thus pass freely into the pelvic cavity. Not being as enthusiastic as many others about even ordinary salpingography, and having had no experience whatever with the method described by the authors of this paper, I do not know whether the hazard of pelvic reaction or infection with such a method is as definite as I would think it might be. Certainly I do not think it would be justified unless the information it yields is of genuine importance and not obtainable by simpler and safer methods. Being a rather old-fashioned fellow, this same restriction seems to me to be a fair one as applied to other "fancy" methods of diagnosis which are constantly being introduced.—Ed.)

## PERITONEAL PNEUMO-RADIOGRAPHY IN GYNECOLOGY

A. G. PERALTA RAMOS, JR., A. I. GUITARTE AND A. A. BIANCHI

Bol. Soc. Obst. y Ginec. de Buenos Aires, 25: 196-216, 1946

This procedure consists of injecting either oxygen or carbogen, preferably the latter, into the peritoneal cavity, by using the transtubal or transabdominal route, after which an x-ray picture is taken. The gas injected occupies the pelvic cavity and removes the omentum and intestines to the upper abdomen. Moreover, it fills up the free spaces between the organs, permitting thereby the obtaining of good pictures.

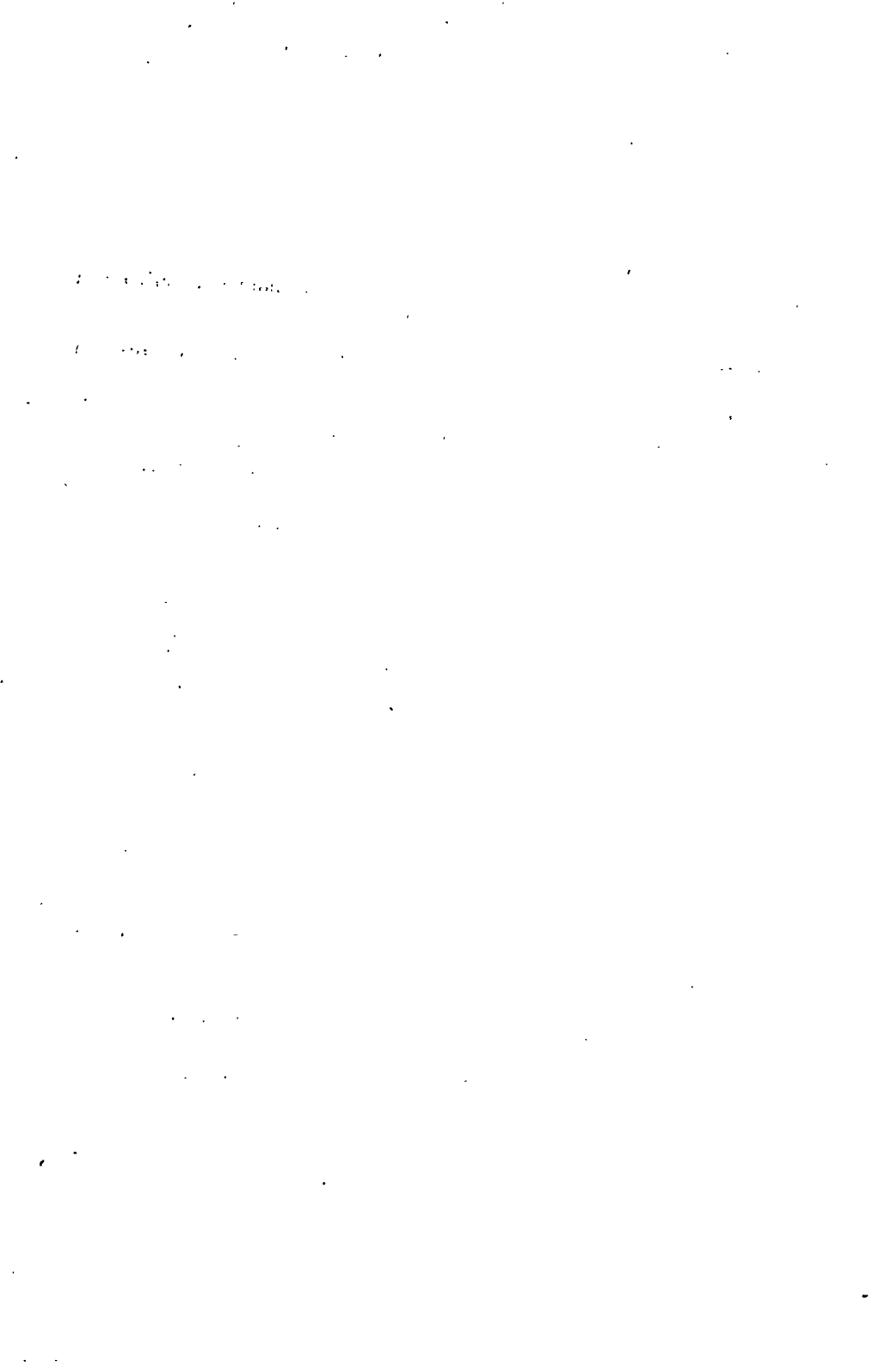
The authors advise the use of carbogen by the transabdominal route, by using a needle which is inserted into the peritoneal cavity with the patient lying ventrally in Trendelenburg.

They finally report the results of 10 peritoneal pneumo-radiographs performed alone and 2 combined with hysterosalpingography, both in patients with normal genital organs and with gynecological conditions (polycystic ovaries, hydrosalpinx, uterine myomatous nodules, etc.) some of which were difficult to diagnose otherwise. In those cases submitted to surgery afterwards, the operative findings confirmed the impressions yielded by this semiologic procedure. As the authors state, the latter requires large experience in order to make correct interpretations, and one ought to be familiar with the picture of the normal genital organs before deciding to interpret pathological findings.

Pneumo-radiography is contraindicated in old women, neoplastic invasiveness and in pelvic inflammatory disease whenever adhesions are suspected at the puncture level.

P. S.—It is difficult to evaluate as to the precision of this procedure by the study of the case hereabove presented, since most of them had previously been clinically diagnosed already. And, as a matter of fact, the value of the procedure re-





# ANNOUNCEMENT

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main objective of the paper, as I understand it, is not so much to report the frequency with which various bacteria were met as to call attention to the authors' observation that the variety of bacteria and the types of bacterial flora were not significantly different in cultures taken from the postpartum uterus of normal and infected patients.

In regard to the anaerobic streptococcus there can be no question about the validity of this finding since all previous investigators have encountered this organism in vaginal and uterine cultures just about as frequently in normal gravidae and puerpera as in patients with puerperal endometritis, that is, in from 40 to 70 per cent. The same holds true in respect to another important anaerobe, the Welch bacillus. Thus, in 253 prenatal patients, Falls found this bacterium in the vagina in 15, an incidence of 5.9 per cent; among 78 gynecological patients, he demonstrated it 13 times, or in 16.6 per cent, while in 17 incomplete abortions he recovered it in 5 cases, or in 29.4 per cent. (Am. J. Obst. & Gynec., 25, 280, 1933.) Some years ago, in our own clinic, Sadusk and Manahan not only studied the incidence of *B. Welchii* in the vaginas of normal gravidae but attempted to evaluate the virulence of the organism found. Among 132 Negro patients examined, the bacillus was isolated in 12, or 9.1 per cent; in 6 of these cases the bacterium was lethal to a guinea-pig in less than 48 hours, with characteristic findings at autopsy. Of 87 white patients, 7 or 8.1 per cent showed *B. Welchii*, 3 of the strains being lethal to guinea pigs. (J.A.M.A., 118, 14, 1939.)

In view of the established prevalence of these anaerobic organisms in the genital tract of normal women, one would expect puerperal infection from this source to be much more frequent than it is. Its comparative rarity is usually explained on the grounds that some factor or factors other than the mere presence of bacteria are necessary for actual endometritis to be produced, such as trauma and/or some especial virulence of the organism. The transcendent importance of trauma in the etiology of puerperal infection is well understood by all of us and needs no further comment. In regard to the other factor mentioned, namely the relative virulence of various strains of bacteria, we are completely in the dark in so far as these anaerobic organisms are concerned. As mentioned above, Sadusk and Manahan found that about one-half the strains of Welch bacilli recovered from the vaginas of normal gravidae were lethal to guinea pigs, while the other strains appeared to be non-pathogenic. In regard to the anaerobic streptococci, we do not even have a satisfactory classification of them, let alone any knowledge of the relative virulence of various strains. While they are considered as a group to be nonhemolytic, Colebrook and Hare found that 2 of 60 strains studied by them did produce hemolysis. (Brit. Med. Jour., 2, 134, 1930.) From the few scattered reports available it would appear that the pathogenicity of different strains of anaerobic streptococci for laboratory animals differs widely; although most are not pathogens, occasional strains have produced rapidly fatal infections in mice, guinea-pigs, etc. From what has been said, and in view of the fact that anaerobic streptococci are the most common cause of puerperal infection, the need for some systematic classification of these organisms is apparent. Perhaps the authors of the above paper will manage one of these days to undertake this important chore. We hope so.

The beta hemolytic streptococcus was found by Hite and his associates on uterine culture in 10 per cent of normal postpartum patients and in 4.4 per cent of febrile puerpera. In evaluating these figures it must be understood that no effort was made by the authors to classify this group of bacteria according to pathogenicity. It will be recalled that Lancefield and Hare have shown by means of precipitin reactions that there are some 9 different types of hemolytic streptococci of which only one group, Group A, is commonly pathogenic in the human. The other types, designated by succeeding letters of the alphabet, may be present as saprophytes in the human but are rarely the cause of serious infections although a few isolated fatalities have been reported from Groups B and C. Moreover, there is abundant evidence to show that the Group A hemolytic streptococcus is not a normal inhabitant of the vagina whereas those in the other groups may be so encountered now and then. Since the febrile puerpera studied by Hite and his associates had only mild infections, a break-down of the hemolytic streptococci into the above groups would probably have revealed no Group A members and hence the flora of hemolytic streptococci in the normal and

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# Obstetrics

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## PHYSIOLOGY OF PREGNANCY, LABOR AND PUERPERIUM

### A STUDY OF THE BACTERIAL FLORA OF THE NORMAL AND PATHOLOGIC VAGINA AND UTERUS

K. EILEEN HITE, H. C. HESSELTINE AND L. GOLDSTEIN

*Chicago, Ill.*

*University of Chicago and The Chicago Lying-In Hospital*

*Am. J. Obst. & Gynec., 53: 233-240, 1947*

The writers report the results of a bacteriologic investigation of 250 cultures from the vagina and uterus of 248 patients, and discuss the significance of the findings. The study included vaginal cultures from normal prenatal patients, cases of trichomoniasis, moniliasis and nonspecific vaginal infections and intra-uterine cultures from normal and febrile postpartum patients, and a few post-abortion puerperae.

The results are tabulated to show percentages of isolations, the isolation of anaerobic bacteria, and the predominant micro-organisms. In general, the bacterial flora of the vagina of normal prenatal patients was similar to that of patients with mycotic and nonspecific vaginitis. A variety of bacteria was isolated from the postpartum uterine cavity of normal and endometritis patients and from the vagina of trichomoniasis patients. The bacterial flora in the latter groups was similar.

This study indicates that the variety of bacteria and the type of bacterial flora are not significantly different in cultures taken from the postpartum intra-uterine cavity of normal and endometritis patients and from the vagina in trichomoniasis. The mechanisms of development of clinical intrauterine infection are obscure. However, the diversity of bacteria which may be present in such infections should be considered in any evaluation of therapeutic measures, as should the probability of synergistic infection. The authors further call attention to the implication of the postpartum uterus and vagina as portals of entry for organisms, such as nonhemolytic streptococci, to more remote body regions.

The original article of Hite, Hesselstine and Goldstein, digested above, contains a detailed statistical table—rather too extensive to include in the above abstract—showing the frequency with which various types of bacteria were encountered in normal gravidæ, in patients with vaginitis, and in normal and febrile puerpera. The findings in respect to anaerobic organisms agree with previous reports in showing a high incidence of these bacteria both in normal and febrile puerpera, the exact percentages for the anaerobic streptococcus being 28.0 and 33.4, respectively in the two clinical groups mentioned. However, the

(Despite experimental evidence purportedly to the contrary, Karnaky has maintained for some time that the estrogenic hormone in the human is a uterine sedative and tends to prevent rather than promote abortion; and the accumulated data of several recent studies, in addition to his own, now indicate that he is correct. The general belief that estrogens stimulate uterine motility and cause abortion has been based almost entirely on experiments performed on mice, rats, guinea pigs and rabbits,—animals which are known to abort with the greatest of ease under all kinds of circumstances. On the other hand, several competent investigators, including Carl Hartmann as well as Van Wagenen and Jenkins, have injected monkeys with huge amounts of estrogen everyday throughout pregnancy without noting the slightest effect. In other words, the pertinent experimental evidence is in keeping with Karnaky's claim.

Without wishing to quibble about a minor point, I cannot help question the rationale of injecting any agent directly into the uterine muscle as Karnaky did in the case described above. The implication is, of course, that quicker and more efficacious action is obtained. Similarly, some obstetricians still inject pituitary extract into the uterine muscle at cesarean section. But what actually happens when this is done? Can the medication be expected to affect any but a few muscle fibers in the immediate vicinity of the injection? Surely it cannot diffuse very far. Is not the greater part of it absorbed and returned to the uterus by way of the general circulation just as if it had been injected into the deltoid muscle? Will not intravenous injection give more rapid and intensive effects?—Ed.)

## THE SECOND STAGE OF LABOR; INTERNAL ROTATION

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*Am. J. Obst. & Gynec., 53: 488-493, 1947*

Examinations have been made on some 2900 primiparas and some 2500 multiparas during labor to ascertain when internal rotation occurs. As a result, it may now be said that internal rotation is complete at the time the head reaches the pelvic floor in approximately  $\frac{2}{3}$  of all patients (hereafter referred to as early rotation). In something less than 30 per cent, internal rotation is completed very shortly after the head reaches the pelvic floor. In something over 4 per cent of all patients, rotation to the anterior does not take place. Patients rotating anteriorly after reaching the pelvic floor, those rotating posteriorly, those undergoing partial rotation and those undergoing no rotation are hereafter referred to as late rotation.

The size of the head or the size of the infant is not a factor in rotation. It was found that multiparas with good labor pains will have early rotation in 72 per cent of all cases. Primiparas with poor labor pains will have early rotation in only 58 per cent of all cases. Thus, parity and the character of labor pains appear to be definite factors in this process.

When rotation does not take place until the head reaches the pelvic floor, it takes place in multiparas during the next one or 2 contractions, and in primiparas during the next 3 to 5 contractions. The amount of delay in rotation is not evidenced in the pelvic floor phase of the second stage. Similarly, rotation

infected cases would still have been the same. The point I should like to make here is that the findings reported in this paper for the hemolytic streptococci may be misleading to some readers who will possibly conclude that even infections from the hemolytic streptococcus are endogenous and, accordingly, are more or less a matter of chance. By all the evidence at our disposal this is untrue because the only hemolytic streptococcus which commonly causes serious puerperal infection—the scourge of countless epidemics of old—the Group A type, is not found in the puerperal uterus unless it has been brought there from without. Thanks to improved delivery room technique, this deadly bacterium is rarely met in present-day obstetrics and when encountered, can usually be combatted satisfactorily by chemotherapy. Nevertheless, it constitutes an everlasting threat and as a teaching principle, its exogenous character needs continual re-iteration.—Ed.)

## ESTROGENIC TOLERANCE IN PREGNANT WOMEN

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*Am. J. Obst. & Gynec., 53: 312-316, 1947*

Thirty-five women, from 2 weeks to 7 months pregnant, were given 100 to 250 mg. of diethylstilbestrol almost daily by mouth and intramuscularly from the second week of pregnancy until term. Total dosages ranged from 789.47 to 24,050 mg. of diethylstilbestrol. In no instance was the pregnancy interrupted during the administration or following the withdrawal of the stilbestrol. The sudden withdrawal of such large unphysiologic doses of exogenous estrogens did not cause any untoward effect on the pregnancies regardless of the time during pregnancy that the drug was withdrawn. The only abnormal symptoms occurred in patients who were given 500 or more milligrams as the initial dose. They became nauseated and vomited just like nonpregnant patients who had received 5 or more milligrams. In brief, pregnant women tolerate with ease approximately 1000 times the dosage of diethylstilbestrol that nonpregnant women do.

One patient with threatened abortion was diagnosed as having ectopic pregnancy because of pain over the left tubal region and "spotting". At operation a 3 months' pregnant uterus was found, which was spastic, firmly contracted and blanched. Stilbestrol (100 mg.) was administered directly into the anterior wall of the uterus. The uterus relaxed and became normal in color. The patient delivered a normal child at term.

A series of x-rays were taken of the uterus in one normal pregnant patient before and following the injection of 200 mg. of diethylstilbestrol into the anterior wall of the cervix. The uterus failed to show any evidence of contraction, and remained the same size as on the control film.

All the babies in the present study were entirely normal. All exhibited a darkening of the areolae around their nipples, labia and linea albae, similar in intensity to that of thier mothers, indicating that this effect of diethylstilbestrol also is shared by the fetus.

terectomy was done on 5 of these just after the blood pressure had started to decline. (The sixth animal aborted placentas and fetuses on day 16, and is included in this group, as the blood pressure behavior was identical with those in which hysterectomy was done.) There was a sharp, transient drop of pressure on the day following operation; this was attributed to the operative procedure. Within 48 hours the blood pressure of each animal had returned to its previous level and showed no further change.

Six rats in Group C had a mean systolic pressure of 169 mm. before conception. The fetuses were killed on day 15, 16 or 17. Four of the rats emptied their uteri; in 2 animals there was no evidence of delivery, but the uterine swellings decreased in size, suggesting complete reabsorption. In contrast to Group B, the blood pressure continued to decline in every animal, and then rose again 4 to 10 days after surgery in all but one rat.

Thus, it is seen that the fall in blood pressure observed in rats during late pregnancy is abolished by hysterectomy or by complete abortion, but still occurs when the placentas survive experimental death of the fetuses. The author suggests that the mature placenta results in this decline of hypertension either by causing maternal circulatory changes mechanically, or by contributing enzymatic antipressor substances. 1 figure.

## VITAMIN A STUDIES OF PREGNANT WOMEN AND OF NEWLY BORN INFANTS

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Am. J. Dis. Child., 72: 488-489, 1946

The writers have previously shown that there is a fall in the concentration of vitamin A in the blood plasma during the last trimester of pregnancy, most likely due to high demands for vitamin A by the fetus. Considerable quantities of vitamin A were found stored in the livers of newborn infants.

In the present study moderate supplements of vitamin A and of carotene were given during the last few months of pregnancy. It was found that this prevented the fall in concentration of vitamin A during the last trimester. However, vitamin A and carotene values of cord blood were no higher in women receiving daily supplements of vitamin A than in those receiving no supplements. Even huge amounts of vitamin A (500,000 units) administered during labor had no appreciable effect on its concentration in the blood of the newborn, although concentration in the maternal blood was considerably raised.

A preliminary experiment carried out on guinea pigs suggests that in this animal the liver withdraws vitamin A so efficiently and rapidly that transmission of the substance through the placenta is not reflected in increased concentration in the blood of the newborn.

of an occiput posterior into the hollow of the sacrum and spontaneous delivery does not materially delay the completion of delivery. In those groups in which partial rotation takes place, or in which no rotation occurs, failure of rotation is a much more significant item in primiparas but not of serious import in multiparas. In primiparas with poor labor pains, forceps delivery was thought necessary in 75 per cent of cases. The data presented in this paper suggest that poor pains is a much more significant item than failure of rotation, which is apparently of equal importance to "large" baby as a deterrent to prompt completion of the second stage. Recent careful observation has shown that voluntary effort is at least equally important to the labor pains.

It would seem that operative delivery is rarely, if ever, necessary in multiparas, except perhaps in the group of large baby, late rotation and poor pains, where about one out of 16 patients was so delivered in this series. In primiparas, forceps are not necessary where the pains are good, but the incidence of forceps delivery is increasing when pains are poor, particularly in the presence of large baby or late rotation. There should be a delay of 30 to 60 minutes after the head reaches the pelvic floor before forceps delivery is attempted in primiparas. Frequently, rotation will have occurred in 30 to 40 minutes, when in the first 15 or 20 minutes it had seemed most unlikely. The old rule of "not over one hour on the pelvic floor" is still a reliable one.

## RELATION OF THE FETUS AND PLACENTA TO THE DECLINE OF HYPERTENSION IN PREGNANT RATS

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*Am. J. Obst. & Gynec., 53: 275-278, 1947*

The purpose of this study was to determine whether it is the fetus or the placenta which causes the fall of blood pressure in normal and hypertensive rats during late pregnancy. It has been well established that the placenta continues to function as an endocrine gland after the death or removal of the fetus. In this study, therefore, it was assumed that the placenta continued to function after fetal death so long as its presence could be demonstrated by daily palpation.

The systolic blood pressures of 5 rats in control Group A had stabilized at an average level of 176 mm. during the week before conception. In 3 animals there was a rise of pressure during the first 12 days and, in all, the blood pressure began to fall between days 12 and 15, reaching the lowest point (about 140 mm.) at delivery, and returning to its original level about 10 days post partum.

Six rats in Group B began pregnancy with a mean pressure of 181. Hys-

amount of blood loss visible at all times, the obstetrician will plan his treatment and replace the loss when the amount passes 300 cc., rather than to wait for the clinical evidences of hemorrhage.

Davis and Boynton (1942) described a technique by which  $1/320$  grain of ergotrate (ergonovine) is injected intravenously immediately after the birth of the child's head, pausing about one minute before delivering the shoulders and body. This pause of one minute allows for separation of the placenta while the cervix is held open by the body of the baby.

By employing the method of measuring blood loss described in this paper, it was possible to compare the length of the third stage and the blood loss in cases where the Davis method was used with a number of controls where the older technique of the third stage was used. In 75 cases (controls) in which no ergotrate was given until after the birth of the baby, the average measured blood loss was 327 cc. In 430 cases in which intravenous ergotrate was given in the second stage, the average measured blood loss was 181 cc. Excluding those cases (46) out of the 430 in which blood loss was chiefly from lacerations or episiotomies, there were 384 deliveries where ergotrate was given intravenously after the birth of the head, and the average measured blood loss was 136 cc., almost entirely from the uterus. The average length of the third stage after intravenous ergotrate in the second stage was 6.0 minutes (60 per cent had a third stage of 4 minutes or less). The average length of the third stage among the controls was 9.88 minutes.

Separation of the placenta occurs almost immediately after the birth of the child, being accomplished by uterine contraction. Spontaneous expulsion is uncommon after the use of analgesia and anesthesia. It is concluded that the placenta should be expressed after its separation; nothing is gained by delay. 1 figure.

## A STATISTICAL STUDY ON THE EFFECTS OF EXERCISES ON CHILDBEARING

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J. Obst. & Gynaec. Brit. Emp., 54: 77-85, 1947

The writer has analysed the obstetric case notes of 340 primiparous women who had received instruction in maternity exercises and of a comparative group of controls. The prenatal exercises were designed to teach the woman the basic principles of muscle control, of mental and physical relaxation and effective use of muscles. They were also intended to help her adopt and maintain good posture during pregnancy, to improve circulation and muscle tone, and to increase the flexibility of the pelvic joints. Exercises for confinement were designed with the object of shortening labor, lessening fatigue and aiding natural childbirth.

## MANAGEMENT OF NORMAL PREGNANCY, LABOR AND PUERPERIUM

### AN EVALUATION OF THE PREGNANCY TEST BASED ON OVARIAN HYPEREMIA IN THE IMMATURE RAT

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*Am. J. Obst. & Gynec., 53: 317-320, 1947*

The ovarian hyperemia pregnancy test was employed in a series of urines from women in whom pregnancy was suspected. In 108 tests, using 2 rats per sample of urine, an accuracy of 84.5 per cent was obtained, but in 84 tests using 3 rats per sample, an accuracy of 90.5 per cent was obtained. All errors were failures to get a positive reaction from urines of pregnant women.

With 14 additional urines collected in cases where increased excretion of pituitary gonadotrophin might be expected (castrate, menopause, and at time of ovulation), one (at time of ovulation) gave a positive reaction.

In 80 of the tests where 3 rats were used, one rat was injected intraperitoneally and autopsied 2 hours later, one was injected subcutaneously and autopsied 6 hours later, and one was given both types of injection. There was no significant difference in degree of accuracy by any of the 3 methods.

Individual animal variation in the ovarian hyperemic response was determined by injecting rats with a series of graded doses of chorionic gonadotrophin. The results showed an extreme variability in individual animals.

### THIRD STAGE OF LABOR. I. MEASUREMENT OF BLOOD LOSS; II. INTRAVENOUS ERGOTRATE

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*Am. J. Obst. & Gynec., 53: 271-274, 1947*

The physiologic or normal blood loss in the third stage of labor as measured by 4 authorities averages 348 cc. This loss is compensated for by the increased blood volume built up during pregnancy (about 500 cc.). Any amount of loss above 500 cc. is considered as pathologic or a postpartum hemorrhage. It is stressed that blood loss at delivery should not be estimated but measured. The author employs a sterile metal plate which is slipped beneath the patient's buttocks after birth of the baby. This plate drains into a glass jar, of over one liter capacity, supported by a ring bracket to the delivery table. With the



seem to affect the normal prothrombin level in pregnant women, but that, when given during labor, it did cause definite elevation of the blood prothrombin level in 16 of 22 infants. These studies have been continued until a series of 500 cases has been accumulated, which are the subject of this report.

In this series of 500 cases, an intramuscular injection of 20 mg. of menadione bisulfite or hykinone was given to every mother before delivery. If labor was prolonged more than 12 hours, this injection was repeated. If labor was 4 hours or less the infant was given an additional injection of 2 mg. of hykinone. Prothrombin tests were done on the infants daily for the first week of life.

The results are compared with cases in which no vitamin K was administered. In these patients in which no vitamin K was given to mother or child, the prothrombin levels started at about 45 seconds on the first day of life, and rose to about 60 seconds between the second and fourth day, dropping to a normal of 32 seconds on the seventh day. The composite curve of the treated cases started at about 32 seconds on the first day of life and, with slight variations, this level was maintained throughout the first 7 days. Five of the untreated cases maintained a flat prothrombin curve, in spite of the fact that no vitamin K had been administered. In 3 of the 500 treated cases there was no response in the infant. One of these infants was jaundiced. With a lack of response in 3 out of 500 cases, it may be said that the method of administration of vitamin K as outlined was adequate in 99 per cent of the infants.

It is concluded that vitamin K injected into the mother before delivery or into the infant immediately after birth is the best prevention for hemorrhagic disease of the newborn. 1 figure.

## EARLY AMBULATION IN OBSTETRICS AND GYNECOLOGY

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J. South Carolina M. A., 43: 29-30, 1947

Although this article contributes no original data, it is a concise survey of the present trend toward early ambulation in obstetrics and gynecology. The author begins by recalling that Charles White, the eminent 18th century British obstetrician, wrote in 1793: "The parturient should lie very high with her head and shoulders and should sit up in bed many times a day, especially when she takes food, and as often as she suckles her child, and she should kneel when she has occasion to make water, which should be done often. The frequent upright posture is of the utmost importance and cannot be too much enforced. It prevents lochia from stagnating, the stools and urine from being too long retained, and promotes contraction of the uterus, together with that of the abdominal muscles.

The proportion of cases of normal, abnormal and premature labor was approximately equal for both the exercise and the control group. The percentage of vertex presentations was nearly identical in both groups.

Spontaneous delivery occurred in 87.9 per cent of the exercise group and in 88.6 per cent of the controls. The average duration of labor in spontaneous vertex deliveries in the exercise group was 21 hours, 44 minutes, and for the controls, 21 hours, 24 minutes.

Forceps delivery occurred in 12.1 per cent of the exercise cases of vertex presentation, and in 11.4 per cent of the controls. The number of breech presentations was the same for both groups.

Premature labor occurred in 5.3 per cent of the exercise group and in 4.1 per cent of the controls. The average duration of premature labor was 19 hours, 55 minutes for the exercise group and 14 hours, 20 minutes for the controls.

Sedatives and analgesia were administered to 50.3 per cent of the exercise cases and to 42.6 per cent of controls. Analgesic drugs were given to 15 per cent of cases in both groups. Gas air analgesia was given to almost all patients in both groups.

Among the exercise group there were 8.3 per cent of recorded cases of postpartum hemorrhage among cases of spontaneous delivery, and 12.8 per cent among the controls. Perineal lacerations occurred in 60 per cent of the exercise cases of spontaneous delivery, and in 56.2 per cent of the controls.

The average birth-weight of the infants was 7 pounds, 4½ ounces for both groups. Stillbirths occurred in 2.4 per cent of the exercise group delivered at or near term, and in 2.2 per cent of the control cases. There was one infant death in the exercise group and 2 in the controls.

It is concluded that infrequency of instruction and the lack of supervision in labor by a trained instructress lessened the value of the antenatal training.

## PARENTERAL VITAMIN K THERAPY DURING THE ANTEPARTUM PERIOD AND ITS EFFECT ON THE INFANTS' PROTHROMBIN LEVELS

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Am. J. Abst. & Gynec., 53: 300, 1947

In a preliminary report, McCready, Callahan and Grandin (Am. J. Obst. & Gynec., 42: 398, 1941) reported that parenteral vitamin K therapy does not

(Although early ambulation in the puerperium was forced upon most of us as a concession to the unprecedented demand for obstetrical accommodations during the war, the majority of obstetricians who have had experience with this program will agree with Hall that its advantages outweigh its possible disadvantages. Patients who have had babies in the old days when a bed rest of ten days was routine are unanimous in favoring early ambulation, stating that they feel much stronger when they start to walk on the third day than they did previously on the tenth day, do not experience the dizzy sensation on standing which was common under the older program and ultimately regain their strength and sense of well-being much sooner. Bladder and bowel complications as well as phlebitis are less common. Convalescence from cesarean section is also much smoother if a similar routine is followed. It is our tentative impression, however, that if early ambulation is to be practiced after cesarean section, it is probably advisable to use silk in the fascia.

Accordingly, even if beds for obstetrical patients became unlimited, it seems unlikely that early ambulation would be discontinued because its advantages have been proved; but patients might well be kept in the hospital a few days longer than we do at present, let us say, to the tenth day or so. Evidence thus far accumulated does not indicate that early rising conduces to prolapse but whether the same impression will obtain when these women are examined 10 or 20 years hence cannot of course be stated at the present time.—Ed.)

The sooner she gets out of bed after her delivery, the better; even on the same day if possible; she should not defer it beyond the second or third at the farthest." (Treatise on the management of pregnant and lying-in women, 1793)

In considering early puerperal ambulation, it should be noted that certain objections have been encountered as follows:

*Objections by Doctors:* (1) Fear of medicolegal consequences. (2) Fear that episiotomies would break down. (3) Fear that prolapse and retroversion would be increased. (4) Fear of excessive postpartum bleeding. (5) Fear that patients would not approve of early rising.

*Objections by Patients:* (1) The procedure was unfamiliar to them, therefore they were not sure it was good. (2) That they needed rest and it might tire them too much to get up. (3) That they were too weak to walk. (4) That rising might make them bleed too much. (5) That they might break their stitches.

That these objections have no actual basis in fact to justify them has been proved not only by several studies in the literature but also by the author's own experience. In his opinion, the advantages of early puerperal ambulation far outweigh the disadvantages and may be enumerated as follows: (1) The patient's morale was improved and early rising was eagerly accepted by the large majority of patients. (2) Bowel and bladder function was improved with less catheterization and cathartics. (3) The patients felt better, were stronger and regained their normal strength much faster, thus cutting down on required nursing service. (4) No excessive bleeding developed. Although the lochia was usually more profuse for the first three to five days, involution of the uterus was hastened. (5) Incision of both the perineum and abdominal wall healed with no increase in incidence of breakdown or infection. (6) At the followup examination uterine prolapse was absent and the incidence of retroversion varied from 16 to 28 per cent but was not increased in the early risers as compared to the late risers. The incidence of retroversion is essentially that which is known to exist in the asymptomatic, nulliparous females. The authors have without exception noted a lessened incidence of morbidity and major complications. Apparently lactation was not altered.

The following routine is recommended: (1) The patient is free to move about in bed following recovery from the anesthetic. (2) Every eight hours during the first twenty-four hours she is asked to sit up on the side of the bed for a few minutes. (3) At each voiding the patient sits upright on the bedpan. (4) On the second day the patient stands upright on four different occasions for a few minutes, followed by sitting upright in a chair for 15 to 20 minutes. Voiding is accomplished by sitting on the bedpan placed on a chair. (5) On the third day walking about the room for short periods of three to four minutes is permitted and complete bathroom privileges are granted. (6) Thereafter the patient may be up and about as she desires as long as each hour of ambulation is followed by an hour of bed rest. By the tenth day only occasional periods of rest are required. (7) The patient is allowed to resume former activities when she has completely regained her strength, usually by the 21st day.

In Grade III, or possibly benign hydatidiform moles, there were 33 cases. This group of moles was characterized histopathologically by variable amounts of hyperplasia of both trophoblastic elements together with a slight but definite anaplasia. It must be remembered that this classification is based upon a gradual transition of cells and is therefore not completely valid. Twelve per cent of the cases in this group became malignant. In these cases the trophoblast was more abundant and somewhat less differentiated, and it was noted that there may be trophoblast growth independent of the villi.

Fifty-nine cases were classified as possibly malignant hydatidiform moles, or as Grade IV. The abundant growth of both syncytio- and cytotrophoblast was the characteristic finding in those tumors clinically benign. The presence of vacuolation in the syncytiotrophoblast may be interpreted as evidence of relative benignity. Of the 10 cases which were clinically malignant, 8 were of chorionadenoma destruens type, with one each of syncytial endometritis and chorionepithelioma in situ.

Of the 39 cases of probably malignant hydatidiform mole, Grade V, there were 20 patients who ultimately developed malignancy of one grade or another, and 19 who remained clinically benign. The striking thing in this group was the marked anaplasia. The trophoblast tended to be of a single indifferent or primitive variety, rather than divided into the syncytial and Langhan types. There was also a loss of basement membrane associated with the adjacent anaplastic trophoblast.

The last grade, or Grade VI, includes the malignant hydatidiform moles. These showed exuberant hyperplasia and marked anaplasia of trophoblast, often invading the endometrium. Of the 17 cases in this group, 100 per cent were clinically malignant.

Of the entire series, 26.5 per cent showed malignant changes in their later course. The prognosis of all grades of chorionic malignancy is excellent, except for the relatively uncommon, invariably fatal chorioncarcinoma. Clinical evidence of malignancy is usually shown by continued evidence of postmolar vaginal bleeding and/or subinvolution of the uterus. The authors have discussed 4 grades of chorionic malignancy.

Chorionepithelioma in situ represented 3.5 per cent in the malignancies. Morphologically, there was evidence of exuberant trophoblastic overgrowth with pleomorphism and loss of basement membrane plus endometrial invasion.

Syncytial endometritis was responsible for 4.5 per cent in the chorionic malignancies. This term represents the lowest grade of chorionepithelioma and implies accentuation of the syncytial placental site giant cells plus chronic infection. There may be myometrial invasion by the syncytial giant cells. There is some question as to whether this represents a true malignancy, for 2 of these patients refused operation and are alive and well 7 months and 4 years, respectively, after delivery of the mole.

Chorionadenoma destruens made up 16 per cent in the malignant types. This group is characterized pathologically by persistent invasion of the myometrium by low grade malignant trophoblasts usually still attached to the parent

## PATHOLOGY OF PREGNANCY

### HYDATIDIFORM MOLE—A PATHOLOGICO-CLINICAL CORRELATION OF 200 CASES

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Am. J. Obst. & Gynec., 53: 1-36, 1947

The purpose of this paper was to determine what, if any, correlation exists between the histological appearance of a hydatidiform mole and the subsequent clinical course of the patient with respect to the development of chorionic malignancy. To make this study statistically valid, the cases have been collected from 109 medical communities in the eastern half of the United States, and they represent the combined efforts of many contributors.

These tumors were placed in one of 6 grades, depending on the degree of malignancy, Grade I representing the benign type and Grade VI the most malignant, according to histological studies. In grading these potentially malignant tumors, 2 general histopathological principles were kept in mind: (1) the degree to which the trophoblast resembled or differed from that of normal placental tissue of the first trimester of pregnancy, and (2) the absolute degree to which it appeared to be undifferentiated, using the criteria employed in grading any tumor. It must be remembered that a tumor derived from trophoblasts differs from other tumors in 2 fundamental respects: (1) it is derived from structures that are not an integral part of the host, and (2) its benign prototype is normally invasive, opens and permeates blood vessels, and thereby often metastasizes to the lungs. The largest group of moles fell into Grade IV, which includes those which histologically are possibly malignant; however, only 17 per cent of these showed ultimate malignancy.

Grade I included 22 specimens of benign hydatidiform moles. None of these moles showed a significant departure from the normal trophoblast pattern of immature chorionic villi. The villous stroma had been converted into a cystic mass at the periphery of which was a layer of loose, avascular, fibroblastic or mesoblastic tissue. In occasional areas of nearly every mole there was a slight benign proliferation of syncytium and/or Langhan's epithelium. None of these tumors became malignant.

There were 30 cases of probably benign hydatidiform moles which were classified as Grade II. Seven per cent of these at a later date showed clinical evidence of low grade malignancy. These moles, as a group, were characterized by a slight to moderate hyperplasia of both trophoblastic elements, but no essential evidence of anaplasia.

come to my personal attention have been of the full-blown metastasizing type, but the one perforating tumor encountered by Hertig and Sheldon in their 200 cases was of the destruens variety. Other kinds of tumor behavior which the authors regarded as malignant, were chorionepithelioma in situ and syncytial endometritis. The authors themselves are doubtful whether these neoplasms will develop clinical malignancy.

Quite obviously the question at hand, namely the frequency of malignancy after hydatidiform mole, hangs on our definition of malignancy. When used in conjunction with a neoplasm, the ordinary connotation of the term is: tendency to a fatal issue, usually through metastases or direct extension to vital organs. As far as any tendency to a fatal issue is concerned, not a single patient among the 200 reported died as the direct result of the neoplasm except for the 5 women with classical, metastasizing chorionepithelioma. One patient in the chorionadenoma destruens group died 5 days after hysterectomy of sepsis and one similarly in the syncytial endometritis group, but none succumbed to the disease in these groups, at least among the 89 per cent of cases followed. The rebuttal to this would be, of course, that the patients in the destruens group all had hysterectomies at varying times after the passage of the mole and that they would have died, or might have died, if the uterus had not been removed. Of this, however, no convincing evidence, let alone any proof is advanced. Moreover, the authors themselves state that, "The follow-up data on the histologically and/or clinically malignant moles may be summarized by the general statement that all cases except those of chorioncarcinoma have an excellent prognosis—even the chorionadenoma destruens." To my ear, the statement that any group of malignant tumors has an excellent prognosis is rather a contradiction of terms; and it might be that the findings of Hertig and Sheldon would be less subject to misinterpretation if some milder and less committing word than "malignancy" could be employed for the destruens, syncytial endometritis and in situ groups.

In regard to establishing or refuting the malignancy of the destruens type, the difficulty is that few of us have the fortitude to carry these patients for months and months. As an example, just two years ago, I had one of these patients in the destruens group whom I followed, after the passage of a mole, for 84 days with repeated bouts of mild bleeding, subinvolution and a serum gonadotrophin which titrated between 2500 and 4000 I.U. per liter, week in and week out. The patient was an intelligent woman, a nurse, with a child of 6; and after discussing with her and her husband the pros and cons of hysterectomy (and after consulting with Dr. Hertig), I removed her uterus 12 weeks after the expulsion of the mole. A typical bluish-black nodule about 7 mm. in diameter was present in the myometrium and showed on histological examination a "possibly malignant pattern." The patient has been in good health ever since the operation. Probably a similar story would obtain in the 27 hysterectomies that were performed in Hertig and Sheldon's series of chorionadenoma destruens. Just what would have occurred if these patients had been allowed to go on, no one knows. Since it seems to be agreed that the destruens tumor does not metastasize, about the only serious calamity that could eventuate would be uterine perforation,—which was seen only once in the 200 cases reported; and even then, blood transfusion and hysterectomy will usually but not always save such patients.

It would be my guess that as we become more and more inured to the fact that tests for chorionic gonadotrophin not infrequently remain positive for 3 or 4 months after passage of a benign mole (Payne, F. L., Surg., Gynec. & Obst., 73, 86, 1941; Toland, O. J.: Am. J. Obstet. & Gynec., 44, 502, 1942), our temerity in carrying these patients for longer periods will increase and we shall find that the majority of these destruens tumors, possibly almost all, will eventually retrogress. If this turns out to be true, we may anticipate an incidence of true malignancy after hydatidiform mole of only some 2 per cent,—a figure which will certainly make us feel much more comfortable in the conservative management of these cases than the rather misleading one of 26.5 per cent.—Ed.)

villi. They rarely, if ever, give rise to metastasis. They usually cause a persistently positive test for chorionic gonadotrophic hormone. The prognosis is good providing a hysterectomy is performed.

Chorioncarcinoma was found in 2.5 per cent of these cases. It is distinguished pathologically by metastases commonly to the lung, brain and vagina. The metastases are pure chorionic epithelium without any villous elements and possess a plexiform pattern of undifferentiated cytotrophoblast, the masses of which are more or less covered by immature syncytiotrophoblast. Even immediate hysterectomy does not usually suffice in the treatment of this type of tumor, and death usually occurs within 2 years as a result of metastasis.

In view of the proved curability, all grades of chorionic malignancy except chorioncarcinoma, regardless of how the latter is treated, it seems reasonable to adopt a conservative attitude regarding the pathologico-clinical approach to the problem of hydatidiform moles. The more malignant the mole appears morphologically, the more likely the patient is to develop some form of chorioma. By thus adopting a conservative attitude of "scientific apprehensive expectancy" many uteri will be saved that are now needlessly removed without adding appreciably, if at all, to the death rate from chorionic malignancy.

(This study is the first attempt that has been made to correlate pathologically a substantial series of moles with their clinical outcome. This fact, the large number of cases reviewed and the established competence of the authors as histopathologists, make this paper the outstanding contribution to this field of recent years.

If the article is skipped over hastily, however, it lends itself very easily to misinterpretation and to my knowledge it has been misinterpreted by several readers. Upon first glance, the finding which stands out most prominently is the 26.5 per cent incidence of malignancy in this series of hydatidiform moles. To the casual reader this might well mean that over a quarter of these moles terminated in the classical, rapidly metastasizing and invariably fatal chorionepithelioma. Actually, the authors report nothing of the sort since only 2.5 per cent of their cases came to this end. When it is recalled that previously reported figures for the frequency of chorionepithelioma after moles have been higher than this,—16 per cent (Findley), 13 per cent (Senarclens) and 5 per cent (Sunde)—it becomes apparent that Hertig and Sheldon's figure gives a much better outlook in regard to classical chorionepithelioma, or what they call chorioncarcinoma, than has hitherto been reported. In discussing this paper Novak commented that he did not believe that more than 1 per cent of hydatidiform moles terminated in chorionepithelioma. In view of the rarity of such cases and the consequent difficulty in arriving at precise estimates of frequency, the present authors' 2.5 per cent and Novak's 1 per cent may be regarded as of the same order and in fairly good agreement.

But if Hertig and Sheldon find only 2.5 per cent of their moles terminating in outright chorionepithelioma what makes up the remainder of their 26.5 per cent of cases, the outcome of which was clinically "malignant"? The great majority of these cases, 32 or 16.5 per cent of the total, fall into the category of chorionadenoma destruens. This designation is used to cover a group of cases characterized pathologically by persistent invasion of the myometrium by low-grade, malignant trophoblast, usually still attached to its parent villus. *These tumors rarely, if ever, metastasize even after curettage.* Clinically, the group is characterized by variable amounts of subinvolution, postmolar bleeding and usually a persistently positive test for chorionic gonadotrophin. This type of "malignancy" is believed to kill by uterine perforation, hemorrhage and infection. As described in an editorial note in the April Survey (2, 167, 1947), the two cases of perforating chorionepithelioma which have



test or by Delfs' method when used in doubtful cases gave a higher value than in normal pregnancy.

*Size of mole cysts.* The mole cysts were either of the small mongo-sized variety or of grape-sized type. In some cases both sizes may co-exist in the same patient. It was found that the small variety had greater tendency to be malignant, though in 1 case of malignancy the cysts were of the large type. Further observation will be recorded along this line.

*Character of mole.* In 72 cases the last curettings were examined microscopically for the detection of malignancy. The authors labeled this method of detecting malignancy as early microscopy, to differentiate it from diagnostic curettage, which is done sometime after mole expulsion to explain the cause of uterine bleeding. By the early microscopy method, out of 72 cases of mole, 24 or 33.33 per cent were found to be malignant. The examination of the uterus of those that were hysterectomized showed early chorioepithelioma, thus confirming the diagnosis of malignancy by early microscopy. Of the 48 cases that were reported as benign, 4 subsequently developed chorioepithelioma. So the safest method for not missing malignancy in those reported as benign would be their follow-up for at least 3 or 4 months. And in those that approximate menopause, they should be followed for at least 3 years.

*Clinical signs of malignancy.* As already mentioned, though the uterus is usually larger than what is warranted by the period of amenorrhea, one should be on the lookout for malignancy when there is much over-distention of the uterus or when the distention takes place suddenly. The small cysts also more often give rise to malignant changes. Of course the microscopical examination of the curettings is the final determinant of malignancy.

*Complications.* Anemia was found in 106 cases or in almost 78 per cent; infection in 59 cases or 43 per cent. The authors classified under infection all those who had fever after the evacuation of the uterus. One of the infected cases, who was admitted with fever and who was curetted outside the hospital, had a ruptured appendiceal abscess besides bilateral ovarian cysts. One case had malaria and liver necrosis. Signs of toxemia in the form of edema, albuminuria, cylinduria, and hypertension were found in 7.81 per cent of the cases.

*Treatment.* The authors advocate a thorough immediate evacuation of the uterus per vaginam on the establishment of the diagnosis. This is to be preceded or accompanied by either hypodermoclysis or blood transfusion, depending on the general condition of the patient. Since 1941 they have followed the routine of sending the last curettings to the pathologist for the determination of the type of chorionic cells, whether they be benign or malignant.

Benign cases are instructed to return for follow-up every month or when they have a recurrence of bleeding not due to menstruation. By this procedure, 4 of the reported benign cases who later developed chorioepithelioma were diagnosed. Of the 30 malignant cases, 17 were hysterectomized; 3 were treated by x-ray; and 10 refused any treatment after the D & C. These cases were lost sight of. The uteri of the hysterectomized cases all showed early chorioepithelioma growths which corroborated the diagnosis of malignancy by early microscopy.

## STUDIES ON HYDATIDIFORM MOLE

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Jour. Philippine Med. Assoc., 22: 349, 1946

Hydatidiform mole is an aberrant condition of the chorionic cells in the early months of pregnancy in which the chorionic cells unduly proliferate while the mesodermic chore of the villus undergoes cystic degeneration. It is because hydatidiform mole has been the precursor in 68 per cent of 72 cases of chorioepithelioma previously reported by us, that this study has been undertaken, especially with the view of detecting the early signs of malignancy.

*Etiology.* The etiology is unknown, but all are agreed that the pathology lies in the ovum and not in the endometrium.

*Incidence.* In the Philippine General Hospital there have been 137 cases of hydatidiform mole from 1940 to 1943 inclusive among 17,321 cases of pregnancy, showing an incidence of 1 for every 126 pregnant women. This is rather a high incidence when compared with Mathiew's figure of 1 for every 2,000! According to Mathiew, mole is most common after 40. The authors have found the age incidence to coincide approximately with the age incidence of pregnancy. It has been found at 15 and at 50, but most frequently between the ages of 20 and 29, and a little less frequently between 30 and 39. Though mole was found in primigravida, it was most common among multipara.

*Clinical History.* Uterine bleeding was usually the complaint that brought the patient to the physician; and though the bleeding began as early as the first month or as late as the sixth month, it appeared most frequently at the end of the third month, and only a little less often in the fourth and in the second month. The bleeding was either of red or of dark chocolate color. The uterus was larger than in the corresponding period of amenorrhea in 63 per cent. In moles that subsequently proved to be malignant, the undue enlargement of the uterus was found in 92 per cent. And, in many of the malignant cases, the uterine enlargement took place in a relatively shorter time. Many of the cases that exhibited no undue uterine enlargement gave a history of having expelled mole outside. As is to be expected, none of the cases showed signs of a fetus except in one case of twins where one twin of 4 months with its placenta was normal and the other a mole.

*Diagnosis.* The correct diagnosis of mole was made in 72.7 per cent. The wrong diagnosis given in order of frequency was as follows: Threatened abortion or miscarriage, incomplete abortion, premature labor, fibromyoma, and placenta previa. The correct diagnosis was later made when the patient discharged mole cysts. The test for increased gonadotrophic serum as shown by Friedman's

toms or in physical signs. In order to establish diagnosis, exploratory measures must be made." That seems to be the consensus of obstetricians abroad, who also believe that early diagnosis is fraught with great difficulty.

Mathieu gives much importance to the verdict of the biologic test on either the uterine or the spinal fluid; Novak, to the biopsy of what is called the diagnostic curettage. Neither of them gives much weight to the clinical method which is to us early enough for diagnosis if done conscientiously.

The authors have found that the Friedman test would not give a positive result even when 12 cc. of urine is used, unless the tumor is fairly well advanced. On the basis of the clinical method, for instance they have operated on 2 cases of uterine chorioepithelioma; one of these tumors was of the size of a corn grain and the other the size of a 50-centavo piece, yet both gave a negative Friedman test with 10 cc. of urine. The Friedman test on the spinal fluid, a test which is supposed to be of diagnostic value, was employed twice in an advanced inoperable case where the tumor had involved the pelvic organs and had metastasized into the lungs. Ten cc. of spinal fluid was used. On both occasions the result was negative. Their experience showed that the test is more sensitive when urine is used.

By diagnostic curettage the authors mean the curettage done for the purpose of determining the cause of uterine bleeding in a patient with or without the history of an abortion or mole expulsion having occurred some weeks or months previously. In other words, it is not the curettage done for the purpose of completing a recent abortion or mole evacuation. The diagnostic curettage is of diagnostic value if the tumor is in the uterine cavity. But if it is in the uterine musculature beyond the endometrium, the negative finding would give a misleading report.

One of the authors wrote in another paper on chorioepithelioma, stating why she objects to the so-called diagnostic curettage when positive diagnosis has already been made by the clinical method.

1. If the result is positive, it merely confirms the diagnosis already made by the data HBEs (the clinical method to be explained later) and nothing new is gained.

2. If the result is negative, it would alter neither the positive diagnosis arrived at through the data HBEs nor the decision for radical treatment. In many of their cases, the tumor was found to be in the muscular wall far beyond the reach of the curette, so that uterine scrapings invariably gave a negative finding.

3. The use of the curette may give rise to infection in a uterus that, because of its softness, would be susceptible to germ growth.

4. The curette may perforate the uterus in cases where the growth has extended throughout the thickness of the uterine wall and thus increase the danger of a radical operation.

5. It may incite the rapid flaring-up of metastasis.

6. At best, it is an unnecessary, if not dangerous, waste of time and energy, simply delaying the performance of a radical operation which should be done as early as possible.

*Mortality.* Of the 136 cases of mole, 4 died. One died of acute anemia 1 hour after D & C. The histopathology of the mole in this case was malignant. At autopsy the uterine musculature was found to be infiltrated with syncytial cells. One died of lobar pneumonia two days after D & C. The histopathology of the mole was also malignant. One died from acute hemorrhage due to advanced uterine chorioepithelioma 14 months after the D & C for mole. The histopathology of the mole in this case was reported as benign. One case died from colon bacillemia and pyonephritis due to the colon bacillus.

(Any comment on this paper must be made with diffidence and with several reservations. In the first place, its senior author, Dr. Acosta-Sison, has had as large an experience with hydatidiform mole and chorionepithelioma as any obstetrician in the world, possibly a larger. In the second place, there is evidence to indicate that hydatidiform mole and chorionepithelioma are especially frequent in the Orient, particularly in the Philippines; and, if this be true, it is conceivable that the behavior of the neoplasm there differs in other respects from the manifestations with which we are familiar in the Occident. Right off, for instance, the incidence of hydatidiform mole, 1 in 126 pregnancies, reported by these authors is 16 times that observed in this country.

If the frequency of hydatidiform mole is so amazingly high in the Philippines, it may well be that the incidence of chorionepithelioma is also higher than among Occidentals. Nevertheless, we cannot help be impressed by the fact that among the 72 cases of hydatidiform mole in which early microscopy was carried out, one-third of which were thought to be malignant, only 1 woman died of chorionepithelioma; and in this case the original mole had been reported as benign. This death rate from malignancy—1 in 72 cases of hydatidiform mole—would seem to be more in keeping with the figures of 1 or 2 per cent cited in the above editorial note than with the 33 per cent reported in this article. But, of course, many hysterectomies were done. It is regrettable, indeed, that the 10 patients who refused hysterectomy for chorionepithelioma were lost sight of because the outcome in these cases might have been more elucidating than in those operated upon.—Ed.)

## STUDIES ON THE EARLY DIAGNOSIS OF CHORIOEPITHELIOMA

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All concede the importance of early diagnosis of uterine chorioepithelioma, for on it largely depends the success of the treatment. But the criteria for diagnosis offered by the obstetrical literature extant are inadequate. These criteria are the much-hailed biologic test (Aschheim-Zondek or its modification, Friedman test) and the findings in what is called diagnostic curettage.

Mathieu, who has compiled all the literature concerning chorioepithelioma for the years 1935 to 1937 inclusive, quotes Teacher's opinion that "during the early stages chorioepithelioma presents nothing characteristic either in symp-

follow-up cases. They also resort to it in cases of doubt when the clinical method is not clear.

In the few cases where the authors resorted to both the Friedman test and diagnostic curettage because they could not establish a positive diagnosis by HBEs, the results were always negative.

However, although HBEs, with or without the development of the ovarian cyst, is able to diagnose uterine chorioepithelioma within 2 to 3 weeks (much ahead of the Friedman test), the authors believe there is still another method by which they can diagnose uterine chorioepithelioma much earlier; and this is the microscopic examination of the uterine curettings obtained immediately after mole expulsion or after an incomplete abortion. They have called this the early microscopy method; and its efficiency depends on the ability of the pathologist to detect malignancy in the chorionic cells and to make an early report.

According to Novak, the criteria for malignancy are:

1. Large masses of trophoblasts growing in bulk with few or no villi and destroying the uterine muscle.

2. Anaplastic activity.

According to Hertig, the pathologist of the Boston Lying-In Hospital, the criteria are:

1. Invasion of the villous stroma by relatively undifferentiated chorioepithelial elements.

2. Moderate or marked anaplasia of the epithelium either with or without mitotic activity.

3. Tissue culture-like growth of detached chorioepithelial elements, usually in fairly large masses and growing upon the surface of a blood clot.

In the second series of 34 cases, 26 (or 76.47 per cent) were of uterine chorioepithelioma, and all of these manifested the diagnostic group data of HBEs. Six were cases of metastatic brain chorioepithelioma the symptoms of which were referable to brain rather than pelvic pathology. Two cases, because of acute internal hemorrhage caused by uterine perforation, were preoperatively diagnosed as cases of ruptured tubal pregnancy.

In our third series, of 30 cases admitted from November 1, 1940, to October 31, 1941, 26 were of uterine chorioepithelioma. Six of these were diagnosed by the group data of HBEs. The diagnosis of these cases was confirmed by biopsy. Of the remaining 4 cases, 1 was of brain metastasis without uterine involvement; 1 was of vaginal metastatic chorioepithelioma, resulting from a ruptured tubal pregnancy; 1 was of ovarian chorioepithelioma resulting from an ovarian pregnancy, and of lung metastasis without uterine involvement. It is in the metastatic chorioepithelioma without uterine involvement that the Friedman test is of great value.

Because of the early microscopy method used for the first time in 1941, the authors were able to treat 6 cases at the earliest stage of the disease. Four of these were treated by x-ray and 2 by hysterectomy as soon as they had received the report within 9 days after the mole curettage. One case which was hysterectomized 3 days after the mole curettage showed darkish punctate growths on the endometrium.

However, though the authors condemn the diagnostic curettage when positive diagnosis has already been made by HBEs, they do resort to it in cases when the group data HBEs are so vague that they cannot, to their satisfaction, make a positive diagnosis by the clinical method. But, in the few cases that they have employed it, the result has always been negative.

The clinical method of diagnosis of uterine chorioepithelioma is described by Acosta-Sison as consisting of a group of data which are found to be so frequently associated that, when present, are of diagnostic significance even in the face of a negative Friedman or a negative microscopic finding of the so-called diagnostic curettage.

These data are labeled as HBEs. H stands for the history of having aborted or having passed hydatidiform mole from a few weeks to as long as 3 or 4 years; B for uterine bleeding coming on from a few days to within 4 weeks after the termination of the last pregnancy; and Es for the enlargement and softening of the uterus. Nonregression or rapid development of ovarian cysts after curettage for mole may also be indicative of uterine chorioepithelioma.

The first three conditions represented by the letters HBEs are the most constant, the most frequently found, and the ones described in their second series of cases. The fourth condition which is the rapid development of ovarian cysts after mole expulsion is an additional clinical finding which they noted in 2 of their present or third series of 30 cases. One of these cases had no uterine bleeding; but the ovaries, which at first were cystic, grew so large that the abdomen, which had become small after the mole curettage, attained the size of a 7-month pregnant uterus at the end of 3 weeks. In the second case, the ovarian cysts, which were only as large as half of a pomelo at the end of two weeks after the curettage for mole, were accompanied by uterine bleeding. In other words, this patient had HBEs in addition to the growth of the ovarian cysts. The other case had no uterine bleeding but the ovarian cysts were as large as an adult head. This case was negative for Friedman test with 10 cc. urine.

No diagnostic curettage was made and the diagnosis of uterine chorioepithelioma was based simply on the history of having been curetted for mole within 3 weeks; the enlargement and softening of the uterus; uterine bleeding in one case; and, in the other, the presence of large ovarian cysts which were not evident when the patient was discharged from the hospital. Both were immediately subjected to double salpingectomy, double oophorectomy and subtotal hysterectomy. On section, the hysterectomized uterus of both patients showed chorioepithelioma on the posterior wall; one had a neoplasm the size of a corn grain below the entrance of the left fallopian tube and the other two excavated tumor growths each of which was of the size of a 50-centavo piece below the entrance of both fallopian tubes.

As a matter of routine and for the sake of record the authors used the Friedman test in their cases. Because they disregarded its negative verdict after having made a positive diagnosis by the clinical method, it does not mean that they consider the Friedman test unimportant. As a matter of fact, they believe it to be a valuable indicator of a developing metastasis or recrudescence in their

4. Friedman test is of value in the follow-up cases or in determining the presence of metastasis after the primary site of the tumor has been radically removed. It should be employed as a routine in all follow-up cases.

5. Diagnostic curettage is employed in cases where diagnosis cannot be made by HBEs.

6. Negative diagnostic curettage in the presence of HBEs is not significant, because the chorioepithelioma may be in the myometrium beyond the reach of the curette.

(See above editorial note for justification of this long abstract and other side-lights. Hertig also lays the utmost stress on prolonged bleeding and persistent subinvolution as indications of malignancy. The more one reads the three articles above, the clearer it becomes that we should know more about the prognosis of chorionadenoma destruens.—Ed.)

## PREGNANCY IN THE PATIENT WITH HYPERTENSIVE DISEASE

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*Am. J. Obst. & Gynec., 53: 372-381, 1947*

From October, 1931, through 1944, there have been in this hospital 301 pregnancies in 218 women in whom the diagnosis of "hypertensive toxemia" could be established, as defined by the American Committee on Maternal Welfare. There were 194 white and 24 Negro patients, a ratio of 8:1; in all hospital admissions the ratio is 18:1. The average age was 32.5 years. Nearly one fourth were para 0; half were para iii or greater. There had been 840 gestations prior to the pregnancy in which the diagnosis of hypertensive disease was made. The uncorrected fetal loss in these earlier pregnancies was 34.8 per cent. Seventy-six per cent of the multigravidas gave a history of previous toxic pregnancy. Of 47 sisters of these hypertensive patients, who delivered at this hospital, 45 per cent had at least one toxic pregnancy.

In 106 pregnancies a decrease in blood pressure of more than 20 mm. Hg was found in 39.6 per cent during the second trimester; the blood pressure drop exceeded 40 mm. in 11.3 per cent. Often the pressure rose again toward the end of pregnancy. In 52.7 per cent of 163 pregnancies there was no significant change from the second trimester readings. There was an increase of more than 20 mm. in 44.2 per cent, and in 16.6 per cent this rise exceeded 40 mm. Usually the patients whose blood pressures rose in the last trimester were those whose pressures had dropped in mid-pregnancy. In 49 per cent of the patients

The second case was one of twins terminating in a miscarriage of 4 months. One twin was a normal fetus and a normal placenta, the other twin degenerated into a hydatidiform mole and coincident uterine chorioepithelioma. The uterus, which was removed 9 days after the miscarriage, showed through the uterine wall many foci of wine-colored chorioepithelioma growths varying in size from a corn grain to a calamansi. This case shows strikingly the necessity of early diagnosis and treatment. And, if by the operation the authors succeeded in freeing this case from the occurrence of metastasis, they owe their success to the pathologist who gave them the correct diagnosis.

A negative report for malignancy, however, should not be taken as final. The patient should be followed up every three to four weeks for the presence of HBEs and for the Friedman test for at least three months, if not for years.

Nine cases are reported representative of the different methods of diagnosis employed. The first 7 cases were diagnosed by HBEs. Case 8 was diagnosed by the early microscopy method. Case 9 was diagnosed by the rapid growth of the ovarian cysts (which normally should have regressed) within 25 days after the mole curettage.

#### PROGRESS IN THE METHOD OF DIAGNOSIS OF UTERINE CHORIOEPITHELIOMA

Prior to 1937, diagnosis was made: (1) At the operating room or at autopsy with the help of the pathologist. (2) By diagnostic curettage. This is unreliable when negative. (3) By Friedman test. This is positive only when the tumor is fairly well advanced.

From 1937 to 1940, diagnosis was made: (1) By the clinical method HBEs. This makes earlier diagnosis than Friedman test. (2) By diagnostic curettage and Friedman test, in cases not positively diagnosed by HBEs.

In 1941, diagnosis was made: (1) By the clinical method of HBEs with or without the rapid development of ovarian cysts in cases sometime after mole expulsion or abortion. (2) By the microscopic examination of the uterine curettings obtained from cases of mole or abortion. This is the earliest method. But its value depends on the ability of the pathologist to recognize the early signs of malignancy, and to give an immediate report. (3) When the early microscopic examination is negative for malignancy, the patient is made to return at the end of 3 or 4 weeks or earlier in case there is uterine bleeding. She is examined for uterine enlargement and softening and for Friedman test.

#### CONCLUSIONS

1. The earliest method of diagnosis of uterine chorioepithelioma is by the early microscopy method; i.e., the microscopic examination of the tissue obtained from the curettage done to complete an abortion or mole expulsion.

2. The next best method of diagnosis of uterine chorioepithelioma is by the HBEs method. It may be employed as early as 3 or 4 weeks after abortion or mole expulsion.

3. The rapid development of ovarian cysts within 3 weeks after mole expulsion or their non-regression, especially when they are accompanied by an enlarged uterus, is another clinical sign of chorioepithelioma.



## A DISCUSSION OF CLASSIFICATION OF TOXEMIAS OF PREGNANCY

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The classification of the toxemias of pregnancy of the American Committee on Maternal Welfare is used as the basis for this discussion. The symptoms and signs associated with the diseases listed in the classification are tabulated for comparison and study.

Certain objective findings which may serve as points of differential diagnosis of the various toxemias of pregnancy are pointed out. Comparing mild hypertensive disease with mild pre-eclampsia, all the findings are fairly common, except the time of onset of symptoms. Hypertensive disease may manifest itself before 24 weeks' gestation, pre-eclampsia usually after 24 weeks. However, in any of the diseases "not peculiar to pregnancy" the appearance of symptomatology may be after 24 weeks, because the pregnancy may have served to light up already existing pathology. Following termination of pregnancy, the persistence of any or all signs for more than 12 to 16 weeks will make it probable that the disease is not peculiar to pregnancy, and therefore hypertensive rather than pre-eclamptic.

Differentiation is sometimes difficult between severe hypertensive disease and severe pre-eclampsia. There is more pronounced edema, proteinuria, and frequent oliguria in severe pre-eclampsia, and the urea clearance usually remains normal in the pre-eclamptic.

Several items are characteristic enough of nephrosclerosis or chronic vascular disease to be differential. Albuminuric retinitis is severe in nephrosclerosis and more marked than seen in the other conditions. In nephrosclerosis, urinary specific gravity is always below 1.020, and often remains low and fixed and the urea clearance is low. Urinary specific gravity and urea clearance are lowered in severe hypertensive disease. In severe pre-eclampsia, urinary specific gravity and urea clearance are normal.

Urinary casts and red blood cells along with diminished renal function are differential in glomerulonephritis. Nephrosis is characterized by a marked edema and little or no elevation in blood pressure. Blood serum shows low protein and high cholesterol.

The aggravation of existing signs and symptoms of the diseases not peculiar to pregnancy occurring after 24 weeks' gestation must be construed to indicate the presence of superimposed pre-eclampsia.

The author demonstrates the necessity for blood chemistry studies and evalua-

the systolic blood pressure near delivery was about the same as before pregnancy. In 21 per cent it was lower, and in 30 per cent, higher.

In half of the 301 pregnancies, the patients never had more than a very faint trace of proteinuria. The other half showed varying amounts only as they approached term. Proteinuria was definitely related to the greater degrees of hypertension.

Renal function was tested in all but 8 pregnancies. Three-fourths of the patients thereby proved normal renal function. If a urea clearance of 60 per cent is accepted as the lower limit of normal, then 15 patients (7 per cent) had renal impairment.

Nine pregnancies in 8 patients were eclamptic. If both rise in blood pressure and proteinuria, or marked proteinuria alone, be required as criteria for toxemia, the incidence of superimposed preeclampsia and eclampsia would be 29.9 per cent, or in pregnancies carrying past the twenty-fourth week, 34 per cent. Premature separation of the placenta occurred in 17 cases, or 5.6 per cent; 9 of these were associated with superimposed toxemia. Superimposed toxemia is somewhat more common in the younger hypertensives. Nineteen of the hypertensive patients who also had eclampsia or pre-eclampsia have had pregnancies subsequent to the one in which the diagnosis of hypertensive disease with superimposed toxemia was made, and 53 per cent of these later pregnancies were again toxic. In 63 subsequent pregnancies in women initially escaping toxemia, 25.4 per cent were toxic.

In the 301 pregnancies studied, there were 8 early abortions (2.7 per cent), 38 late abortions and previable prematures (12.6 per cent), 53 stillbirths (17.6 per cent) and 16 neonatal deaths (5.3 per cent). Fetal loss increased with higher initial blood pressure, second trimester rise in blood pressure, higher pressures near delivery, decreased renal function, proteinuria and superimposed toxemia.

There were 6 immediate maternal deaths, an incidence of 2.0 per cent, or almost 10 times the rate for the whole hospital experience. These deaths are briefly summarized. There were 7 late puerperal deaths, occurring from 6 weeks to 4 months post partum. Four were uremic deaths in malignant nephrosclerosis. The combined immediate and puerperal maternal mortalities were 20 times that of the whole hospital experience.

In 30 patients, all in Group II or III, pregnancy was interrupted before the sixth month. The indications for such interruption, although not definitely established, depend upon past cardiac and obstetric history, parity and the present cardiac status of the patient. Twelve cases were interrupted because of having had cardiac failure before becoming pregnant or having developed it early in pregnancy, and 17 patients had pregnancies terminated because of such marked impairment of exercise tolerance that the added burden of late pregnancy was considered inadvisable. In 22 of the cases, sterilization was combined with therapeutic abortion. All but one of these cases made a satisfactory postoperative recovery; the one exception was a patient who developed pulmonary embolus, but ultimately recovered.

Of the 170 patients who reached the period of viability, 87 were in Group I, 62 in Group II, and 21 in Group III. There was one case of twin pregnancy, one of placenta previa and 4 of severe pre-eclamptic toxemia. Forty patients went into premature labor; 4 of these were induced because of pre-eclamptic toxemia or heart disease. More recent experience has confirmed the view that during the last month of pregnancy there is a lessening of cardiac strain, usually accompanied by clinical improvement.

During recent years heart disease has not been considered an indication for cesarean section. Of 128 consecutive cases of heart disease delivered, cesarean section was performed in only 3 cases, all for obstetric complications. The present policy in the management of labor in the cardiac patient consists of sufficient sedative during the first stage to relieve pain and anxiety and provide adequate rest, and frequently forceps delivery under ether and oxygen or cyclopropane anesthesia. Particular care is taken to prevent postpartum collapse and hemorrhage. Most patients tolerated labor well.

There were 8 deaths in the 200 cases. The average age of these patients was 38.8 years. Proper management during the prenatal period and the wise selection of cases for the termination of pregnancy during the early months would appear to be the prime factors in establishing a low mortality rate.

The only apparent solution for the high fetal loss in a group of patients in whom repeated pregnancies are inadvisable is more bed rest during the seventh and eighth month for all patients in Group II.

## AXIAL TORSION OF THE UTERUS

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The association of pregnancy with myoma of the uterus has given rise to numerous complications. One of the most bizarre and striking of these is axial

tion. During a random 5-year period at the Margaret Hague Maternity Hospital, there were 90 cases of eclampsia, of which 35 were in the hospital before the first convulsion. Of these 35, 23 (65.6 per cent) were classified as "mild pre-eclampsia" before the first convulsion. Thirteen eclamptics of this group had blood chemistries taken before the first convulsion. All 13 patients had a uric acid/nonprotein nitrogen ratio exceeding 10 per cent. Stander and Cadden found in a series of 20 consecutive eclamptics that all 20 had uric acid/nonprotein nitrogen ratios exceeding 10 per cent. Therefore, it is suggested that the diagnostic criteria of toxemia of pregnancy should be: (1) blood pressure; (2) proteinuria; (3) edema; (4) blood chemistry. Pre-eclampsia should be classified and considered severe if the uric acid/nonprotein nitrogen ratio exceeds 10 per cent.

The author emphasizes the fact that the differentiation between "mild" and "severe" pre-eclampsia is of hardly more than academic interest, and suggests abandonment of these designations. Cosgrove and Chesley state that "one cannot assume that a case of mild pre-eclampsia is in no danger of eclampsia—almost two-thirds of all our eclampsia occurred in cases which we had considered mild pre-eclampsia."

## THE OBSTETRIC MANAGEMENT OF PREGNANCY COMPLICATED BY HEART DISEASE

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*Am. J. Obst. & Gynec., 53: 494-499, 1947*

The writer presents an analysis of 200 cases of pregnancy complicated by heart disease. The mortality rate for the entire group was 4 per cent. Excluding 21 cases which did not come under the clinic's care during the prenatal period, the mortality rate was 2.2 per cent. Thirty patients had pregnancy terminated because of heart disease, and 170 patients reached the period of viability. In 40 of these the onset of labor was premature, and this resulted in a fetal mortality of 17 per cent.

One hundred and ninety cases were of rheumatic heart disease, 7 patients had congenital heart disease and 3 had degenerative heart disease. The cases were divided into 3 groups according to the severity of their heart disease. Thus, there were 87 cases in Group I (patients without impairment or with very slight impairment of exercise tolerance), 80 cases in Group II (patients with moderate to severe impairment of exercise tolerance), and 33 cases in Group III (patients with extreme impairment of exercise tolerance or cardiac failure).

the left lower quadrant was a large intramural myoma 15 cm. by 10 cm. On close inspection, the uterus was found to have undergone a 180-degree torsion to the left, so that the myoma which was now on the left lateral, was, on restitution of the uterus, situated on the right posterolateral cornu of the uterus. This fibroid was the mass that had so suddenly appeared on the left side of the lower abdomen at the onset of the acute abdominal pain. Because of the marked congestion of the uterus which presented a cyanotic and mottled appearance, and because the fibroid was such that a myomectomy could not be done, hysterectomy was carried out. The postoperative course was uneventful.

The factors concerned in torsion of the uterus are its weight, size, location and the degree of softening of its isthmic portion brought about by pregnancy. An asymmetrically placed myoma of considerable size may, by its weight alone, produce torsion of the corpus on the softened lower segment. Predisposing to this is the laxness of the anterior abdominal wall found in multigravidae and the relative laxity of the round ligaments. Straining, bending down, and other conditions, which increase and suddenly decrease the intra-abdominal pressure, aid in bringing about the torsion. Increased intestinal peristalsis, and adhesions of the omentum or intestines to the tumor may help in producing the torsion. One other condition which may give rise to the accident is pregnancy in one horn of a uterus didelphys.

In the nonpregnant uterus torsion is invariably a chronic process and rarely presents the picture of an acute abdomen, as seen in the pregnant myomatous uterus. In this nonpregnant state the location and size of the tumor plays a large factor in producing torsion. Thus, a tumor placed anterolaterally and growing between the bladder and broad ligament, may come to occupy a more central position—pushing the uterus upwards, rotating it posteriorly, and bringing about axial rotation of the uterus of greater or lesser degree, depending on the size of the tumor. The development of torsion being gradual, however, its symptoms are rarely seen and the diagnosis is often missed.

Acute torsion of the uterus presents signs and symptoms of an acute abdomen. Pallor, a rapid pulse, abdominal tenderness and rigidity are present. A tumor is palpable, and, on vaginal examination, the pulsation of an artery felt anteriorly is diagnostic. The authors are particularly impressed by the exquisite tenderness of the myoma upon palpation, although the rest of the uterus is not quite so tender.

The treatment is hysterectomy, when myomectomy may not be safely carried out. The authors feel that a mere reduction of the torsion carries with it the possibility of recurrence.

(Primary torsion of the pregnant uterus of sufficient degree to arrest the uterine circulation and produce an acute abdominal calamity, constitutes in the human being, one of the rarest accidents of gestation. In 1931, Robinson and Duvall made a comprehensive study of this complication and could find in the literature only 25 such cases; in the opinion of these authors, moreover, certain of the reported cases were not true examples of this disorder, so that the number of genuine cases on record is probably even less than the above figure would indicate. (J. Obst. & Gynaec. Brit. Emp., 38, 55-84, 1931))

torsion of the pregnant myomatous uterus. Torsion, while not a frequent finding, is seen in the nonpregnant uterus comparatively oftener. The diagnosis is generally made at laparotomy; for, in most instances, the torsion is so gradual that the symptoms produced are often masked by others associated with the enlarged myomatous uterus. In contrast, torsion of the pregnant myomatous uterus gives rise to symptoms and signs of an acute abdomen.

In the authors' experience at the Gynecologic Service of the North General Hospital, 4 cases of axial torsion of the myomatous nonpregnant uterus were found in 44 laparotomies. These torsions were all partial as the cervix was not involved in the process and they were incomplete, as the rotation was less than 360 degrees, but at least 180 degrees. Lesser degrees of torsion as for example, a quarter of a turn, are often observed. It is obvious that, although axial torsion of the myomatous uterus is not quite a rarity, still a torsion of 180 degrees or more is rare enough to merit special mention.

The authors find that none of the standard texts in obstetrics mention axial torsion of the uterus as a complication of pregnancy in a myomatous uterus. The texts of DeLee-Greenhill, Williams-Stander, and Beck do not mention this occurrence. A review of medical reports is unavailable. Duckering recently reviewed 361 cases of myoma in 22,283 pregnancies during a 7-year period in the Woman's Clinic of the New York Hospital and did not find this complication. Two cases are reported:

The first case is that of a 30-year old gravida II, para I, who was admitted on August 4, 1945, complaining of intense lower abdominal pain of 3 days duration and giving history of 2 months amenorrhea. Soon after missing the first period she noticed a mass about 5 cm. in diameter in the right iliac region. The pertinent findings on examination were: pallor, rapid pulse, prostration, marked abdominal tenderness, rigidity, and the presence of a hard, very tender mass in the lower abdomen. On vaginal examination the cervix was soft and the uterus was irregularly enlarged. There was a hard tender mass 10 by 10 cm. to the left of the uterus. The mass could not be separated from the uterus. Exploratory laparotomy revealed the uterus to have undergone a 180-degree dextro-torsion, so that a nodular myoma situated on the right cornu was now on the left and towards the front. The uterus was markedly cyanotic. Myomectomy could not be considered as the tumor was subserous-intramural in type. For this reason hysterectomy was resorted to. The postoperative course was uneventful and the patient was discharged 14 days later.

The second case is that of a 32-year old gravida III, para I, who was admitted on May 13, 1946 with a history of amenorrhea since January 20, 1946. Two days before admission she experienced severe lower abdominal pain and for the first time noticed a mass in the left iliac region. Abdominal examination showed a marked muscular defense and tenderness of the lower abdomen. The cervix was found soft and directed towards the vaginal axis. The uterus was irregular and deviated to the right, enlarged to the size of a 4-month pregnancy. On the left was a smaller mass which could not be separated from the uterus. The patient, with all the signs and symptoms of an acute abdomen, was subjected to laparotomy, which showed the uterus to be markedly congested. Occupying

the left lower quadrant was a large intramural myoma 15 cm. by 10 cm. On close inspection, the uterus was found to have undergone a 180-degree torsion to the left, so that the myoma which was now on the left lateral, was, on restitution of the uterus, situated on the right posterolateral cornu of the uterus. This fibroid was the mass that had so suddenly appeared on the left side of the lower abdomen at the onset of the acute abdominal pain. Because of the marked congestion of the uterus which presented a cyanotic and mottled appearance, and because the fibroid was such that a myomectomy could not be done, hysterectomy was carried out. The postoperative course was uneventful.

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While torsion of the uterus is a rare complication of human pregnancy, it is not uncommon in cattle. Indeed, the complication was first described by an Italian veterinarian, Hippiaer Columbi, in 1662, and since that time it has received much attention in veterinary literature. Fleming, in his "Veterinary Obstetrics," devotes no less than eighteen pages to the diagnosis and treatment of this complication of bovine labor. From the viewpoint of etiology, the rather frequent occurrence of this accident in cattle is of considerable importance, because it calls attention to one of the chief predisposing causes of the condition, namely, the bicornuate uterus, as noted by Manahan. Whereas the normal human uterus is stayed on both sides by ligaments which reciprocally prevent excessive motion and rotation, the pregnant horn of a bicornuate uterus, due to the absence of the round and broad ligaments on one side, is subject to no such restraint and is permitted a wide range of movement. When it is further recalled that these unilateral uteri are longer and narrower than normal, with peritoneal and muscular attachments which are often defective, their tendency to torsion is readily understood. Among the cases of torsion of the pregnant uterus reviewed by Robinson and Duvall, 3 occurred in women with bicornuate uteri.

The only case of torsion of a pregnant uterus which I have seen occurred in a 19-year-old primigravida with a double uterus (uterus duplex, bicornis, cum vagina septa) and presented the clinical picture of premature separation of the placenta. The accident occurred about nine weeks before her expected date of confinement. The course of the pregnancy had seemed quite normal until two days before admission to the hospital, when the patient was seized with abdominal cramps; these were of moderate severity, intermittent in character, and were interpreted by the patient as early labor pains. On the morning of admission, after the patient had experienced this intermittent distress for some 36 hours, the pains suddenly increased to intense severity, became continuous in character and were associated with a slight amount of vaginal bleeding. The pain began, it was said, when the patient was lying in bed and its onset was apparently unrelated to physical exertion, urination, or defecation.

Upon admission to the hospital some eight hours after the onset of the severe abdominal pain, the patient appeared to be in a condition of moderate shock; her face was pale, her skin cold, the eyes sunken, with the sclerae pearly; the pulse rate was between 120 and 130 per minute, and the quality of the beat was somewhat weak. The blood pressure, however, was 105/65. Abdominal examination indicated that the uterus, which was enlarged to the size of an 8 months' pregnancy, was in a state of tetanic contraction and appeared to be exquisitely tender. This tenderness, together with the tense state of the uterus, made it impossible to determine the position of the child. The fetal heart sounds were not audible. Upon vaginal examination a slight amount of blood was seen at the introitus. With the examining fingers in the vagina, it was at once apparent that the vagina was divided by a midline septum into two compartments and at the upper extremity of each compartment was a cervix. The medial aspects of the two cervices were about 0.5 cm. apart. Both cervices were closed but it was noted that there was a small amount of blood coming from the left cervix. A few minutes later a second vaginal examination revealed the fact that a piece of tissue was extruding from the left cervical opening; this was withdrawn and proved to be a uterine cast composed of decidual tissue.

The clinical picture presented by the patient suggested premature separation of the normally implanted placenta and upon this indication it was decided to deliver her by cesarean section. While it was realized that the congenital anomaly discovered at vaginal examination made other diagnoses possible, torsion of the pregnant uterus was not considered. Upon opening the abdomen, the uterus presented in the incision,—tense, shining and of a deep mulberry color. Its appearance, indeed, resembled exactly that of an ovarian cyst which had undergone torsion of the pedicle. Upon passing the hand down into the pelvis, the uterus was found to end in a twisted cord just above the cervix. The uterus was incised and a dead, 1800 gram male child extracted; a considerable amount of blood clot, together with the placenta which had already separated, came out with the child. The uterus was exceedingly thin-walled, completely flaccid and showed no signs of contracting.



Upon looking down into the pelvis from above it could be seen that the uterus had undergone torsion in the neighborhood of the cervix or lower uterine segment, in a clock-wise direction and to the extent of one and a half turns (540 degrees). It was connected to the cervix by a tightly twisted pedicle about 1.5 cm. in diameter. The right adnexa, which were intensely swollen and deep blue in color, lay posterior to the uterus and to the left; the broad ligament on the right side was also involved in the torsion. After untwisting the pedicle, it was clamped, cut and doubly ligated. The other uterus could now be seen lying to the left of the pedicle stump; it was enlarged to the size of a 3 months pregnancy. The abdomen was then closed in the usual manner. After a convalescence of 17 days, the patient had made a satisfactory recovery and was discharged from the hospital in good condition.

The flaccidity of the removed uterus was extraordinary. When placed on a flat surface, its thin walls lay completely flattened out like a soft leather sack. In such a position it measured 26 cm. in length, 20 cm. in width, while the combined thickness of its opposing anterior and posterior walls was less than 2 cm.—Ed.)

## PREGNANCY COMPLICATED BY DOUBLE UTERUS, CERVIX, AND VAGINA

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Am. J. Obst. & Gynec., 53: 321-323, 1947

Three cases are reported in which pregnancy complicated by double uterus, cervix and vagina was carried to a successful termination.

The first case is that of a 26 year old white, para 0, gravida i who was admitted on Oct. 14, 1943, with abdominal cramps of 10 to 15 seconds duration recurring every 7 to 8 minutes. The expected date of confinement was Oct. 26. Physical examination revealed normal findings. Upon admission the abdominal pains vanished. Upon awakening the following morning she complained of backache and the passage of red blood and clots per vaginam. Vaginal examination at this time revealed a double vagina and double cervix. Because of the combination of the congenital anomaly and bleeding from the placental site, a classical cesarean section was performed, and a living infant was delivered from the left uterus.

This patient was first seen by the writer on March 30, 1945, when she complained of vaginal bleeding for 3 days. The last menstrual period had begun on Feb. 13, 1945. On examination, a small amount of sanguinous discharge was observed exuding from the left cervical canal. Examination of tissue removed from the external os revealed the presence of chorionic villi, confirming a diagnosis of incomplete abortion. Vaginal bleeding ceased following the administration of ergotrate.

In July, 1945, the patient returned, stating that the last menstrual period had

begun on May 22. Examination revealed a pregnancy in the left uterus. The pregnancy progressed uneventfully until November, when the patient departed from the clinic. Attempts at follow-up have been unsuccessful.

The second patient whose case is reported was 23 years old. Five months after marriage she complained of inability to conceive and examination disclosed a double uterus, cervix and vagina. Later the same year the patient became pregnant. Her prenatal course was uneventful until spontaneous rupture of the membranes, about a week before the expected date of confinement, followed by strong uterine contractions. Examination revealed a full-term infant with vertex presenting and overriding the pelvic brim. Efforts to engage the head were unsuccessful. It was presumed that failure of engagement was due to obstruction by the nonpregnant uterus. This was confirmed when laparotrachelotomy was performed. A living child was extracted from the right uterus; the enlarged, nonpregnant left uterus was the dystocia factor.

The third patient, a 25 year old white para 0, gravida i, was first seen in Sept., 1944. The expected date of confinement was April 26, 1945. Duplication of the uterus, cervix and vagina had been demonstrated by hysterosalpingography during a previous investigation of sterility of 32 years' duration. The patient was extremely obese and had been treated previously for hypoglandularism. The pregnancy progressed normally. Roentgenographic study in March, 1945, revealed that a single fetus was presenting by breech. The pelvis was android in type, with slightly convergent side walls. Because the physical and endocrine make-up of the patient was such that the adipose-dystrophy-dystocia syndrome during labor might well be anticipated, and because of a breech presentation in the presence of duplication of the generative tract, elective cesarean section was decided upon, and on April 18 a living infant was delivered from the right uterus. Inspection of the pelvis revealed that the nonpregnant uterus would not have been an obstructing factor in the event of vaginal delivery.

The determining factor in the obstetric management of each of these cases was not the congenital anomaly, but the advent of such complications which of themselves necessitated operative intervention.

## PREGNANCY AND SICKLE-CELL ANEMIA

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*Am. J. Obst. & Gynec., 53: 332-334, 1947*

Two cases of sickle-cell anemia complicating pregnancy are reported, in one of which there has been a 5-year period of observation of mother and child. This

disease is confined almost exclusively to the Negro. Only 0.8 to 1.0 per cent of the race develops true sickle-cell anemia and only a few affected women become pregnant. Pregnancy seems to exert an unfavorable influence, but with proper treatment, patients can be carried to term. One third of the reported cases died during pregnancy, labor or the puerperium and the sickling phenomenon was present in  $\frac{1}{3}$  of the babies. There appears to be a tendency to abortion, premature labor, stillbirth and postpartum sepsis.

Case 1.—An 18 year old Negro woman, gravida i, para 0, was seen in January, 1941, with weakness, dyspnea on exertion, pain in the right side and back, lack of appetite and constipation. The expected date of confinement was June 25, 1941. The red cell count was 1,480,000; total white cell count, 21,000; hemoglobin, 6.1 Gm; icterus index, 12.7. Anemia was diagnosed, and ferrous sulfate and bed rest were prescribed. In February, 1941, the patient was admitted for diagnosis of the type of anemia and further therapy. There were several tender scars on the legs, but no lymph nodes were palpable. The mean corpuscular volume, hemoglobin and concentration were 115, 28 and 25 millimicrons, respectively. The fragility test showed complete hemolysis at a saline concentration of 0.24. The reticulocyte count was 18.8 per cent; icterus index, 19. Urinalysis revealed 100 milligrams albumin per liter of urine. A moist preparation of red cells showed sickling. The patient was transfused with whole blood and sent home with a hemoglobin of 10.2 Gm. and a red cell count of 3,000,000. Weekly transfusions of whole blood were given; the hemoglobin ranged from 9 to 10 Gm., and the red cell count remained near 3,000,000. In April, 1941, a relapse motivated another hospital admission, with transfusion and observation for 11 days.

Definite labor began on June 4, 1941, and terminated in the spontaneous delivery of a normal male infant (3,200 grams). Prior to the onset of labor the hemoglobin was 7.5 Gm.; red cell count 2,710,000 with 10 per cent sickling. Six transfusions of 500 cc. of whole blood were given, one antepartum, and 5 postpartum. For 3 days after delivery the temperature ranged from 102 to 104 degrees F. One per cent of the red cells from the umbilical cord showed sickling. Later, red cells of the infant showed 2 to 5 per cent sickling.

At 6 weeks postpartum the maternal hemoglobin was 12.2 Gm.; red cell count, 3,640,000 with one per cent sickling. In March, 1946, the patient still complained of weakness, muscular cramps and occasional abdominal pains. The hemoglobin was 7.5 Gm. red cell count, 1,740,000, and a moist preparation of red cells showed 100 per cent sickle cells. The child appeared well. A moist preparation of his red cells showed 100 per cent sickle cells; the hemoglobin was 10.5 Gm.; red cell count, 4,320,000.

Case 2.—A 16 year old Negro woman, gravida i, para 0, was seen in April, 1944, complaining of 8 months' amenorrhea, nausea, vomiting, fainting and visual disturbances. There were no abnormal physical findings. On July 1, 1944, she entered the hospital in labor with a normal blood pressure, and was delivered spontaneously of a normal female infant (3,030 grams). On admission the red cell count was 2,780,000; hemoglobin, 8.5 Gm.; white cell count, 9,700. A moist preparation of red cells revealed 85 per cent sickle cells.

Mother and child had an uneventful puerperal course. When seen in March, 1946, the mother complained of pain in the right upper quadrant and irregular menstrual periods. The child was apparently in good health. Moist preparations of red cells showed 55 per cent sickling in the mother, and 15 per cent in the child.

Neither of these patients has been able to become pregnant again, although no contraceptives have been used.

## THE RH FACTOR IN ABORTION

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*Am. J. Obst. & Gynec., 53: 467-473, 1947*

In a previous study, the author reported that of 25 cases of recurrent abortion and miscarriage, 22 (88 per cent) possessed the Rh factor in their blood, and 3 (12 per cent) did not. Since these proportions were similar to those of the general population, it was concluded that etiologic influences other than the Rh factor had produced the repeated abortion.

The present study concerns a group of 93 women afflicted with recurrent abortion and repeated miscarriage. During the years that these cases were collected there were approximately 75,000 women admitted to the clinic, showing that true recurrent abortion is not very common.

The blood of 17 (18.3 per cent) of these women did not contain the Rh factor; this incidence is somewhat higher than the 15 per cent of Rh negative women in the general population. Of 34 women afflicted with "true habitual abortion", the blood of 7 (20.6 per cent) did not have the Rh factor. The blood of 2 of the husbands of these 7 women did not contain the Rh factor; thus, only 5 (14.7 per cent) of the 34 couples could have been involved by the Rh factor. This percentage is slightly higher than that in the general population. No proved instance of erythroblastosis was noted in the histories of the entire group of 93 patients, nor at their subsequent delivery in this clinic.

Among 25 patients who had had one normal delivery followed by nonproductive pregnancies, only 8 per cent did not have the Rh factor.

Data are presented which point to no increase in frequency of abortion in pregnancies after involvement by erythroblastosis fetalis.

The influence of the Rh factor in abortion is further appraised by review of the incidence of abortion in a sizable group of women who did not have the Rh factor, as compared with the incidence in a control group of women who did have the Rh factor. These data show that as far as stillbirths and neonatal deaths are concerned, absence of the Rh factor is a definite hazard, since the incidence of

these 2 casualties was 6.4 per cent among women who did not have the factor, whereas in the control series of women who did have this factor, the incidence was only 1.5 per cent. There is no similar evidence that absence of the Rh factor is an important cause in the production of *early* casualty of pregnancy. In fact, in these 2 series, composed of 28 women each, there were actually fewer abortions and miscarriages (9.5 per cent) among women not having the factor than among women who did have the factor (14.4 per cent).

It is concluded that casual or ordinary abortion seems uninfluenced by the mechanism of the Rh factor. The Rh factor possibly has been over-emphasized as a cause of abortion and miscarriage at the expense of more common causes, such as ovarian, pituitary and thyroid dysfunction, and possibly testicular dysfunction in the husband. A woman subject to habitual abortion whose blood does not contain the Rh factor deserves a chance to attempt another pregnancy under the more nearly ideal physiologic environment than proper therapy may provide.

## AN ANALYSIS OF 212 CONSECUTIVE CASES OF ECTOPIC PREGNANCY

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Am. J. Obst. & Gynec., 53: 296-299, 1947

Of 212 consecutive cases of ectopic pregnancy admitted to this hospital since 1915, 172 were treated since 1930, and are analysed in this paper.

The average age of the 172 cases was 34 years; all patients but one were white. All were operated upon. Forty-five (26.1 per cent) were in shock when admitted. The triad of symptoms including pain, vaginal bleeding and one or missed periods was noted in 62.7 per cent of the cases. Pain and bleeding were present in 83.1 per cent. A palpable pelvic mass was noted in 62.6 per cent of the series. Where a mass was not discernible, marked tenderness was often noted when the broad ligament on the affected side was put on tension. Correct preoperative diagnoses were made in 158 cases; 14 were diagnosed at operation; 47 cases with a working diagnosis of ectopic pregnancy were later found to have had other pathology. The corrected error in diagnosis is 36.6 per cent. Twenty-seven curettages, 6 colpotomies and 10 Aschheim-Zondek tests (7 positive, 3 negative) were performed. The authors believe that the greatest single aid in diagnosis is a good history.

Of the 172 cases, 87 were ruptured; 31 had tubal abortion; 50 were unruptured;

there were 2 abdominal pregnancies and 2 ovarian pregnancies. As to type of surgery performed, there were 82 salpingo-oophorectomies, 73 salpingectomies, 14 tubal resections and 3 hysterectomies. Forty-seven per cent of the group had additional surgery with end results the same as in the group having no additional surgery.

Of the entire series of 212 cases, all were operated upon and all recovered.

A study of the report of the Philadelphia Committee on Maternal Welfare of 101 fatal cases of ectopic pregnancy occurring in the years 1930 to 1943 showed that 13 of the fatalities were considered nonpreventable; in 58 per cent responsibility was assigned to the profession. Avoidable factors listed in the report were: failure of diagnosis on the part of the referring physician or the surgeon, delay in operation, lack of transfusion, poor choice of operative procedure, inadequate surgery and multiple surgery.

From a study of the Philadelphia report and the authors' series, it is concluded that the greatest single factor in reducing the mortality rate in ectopic pregnancy is early recognition of shock and its immediate treatment. Of the 90 fatal hospitalized cases in the Philadelphia report, only 42 transfusions were given to 37 patients. Of the 45 cases in the authors' group who were suffering from shock on admission, all were transfused. A total of 82 transfusions were given to this group.

The best aid to diagnosis is a thorough history. Eighty per cent of all ectopic pregnancies will give a history of at least 2 of the salient symptoms of pain, vaginal bleeding and one or more missed periods. Once a diagnosis is made, operation should be performed. The amount of surgery performed, beyond controlling the hemorrhage, should be limited to the patient's condition and to the operator's surgical limitations.

## DICHORIAL UNILATERAL TUBAL TWINS

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Am. J. Obst. & Gynec., 53: 338-339, 1947

The authors report a case of dichorial unilateral tubal twins which represents the first recorded instance of dichorial unilateral tubal twins, and the seventy-ninth reported case of unilateral tubal twins.

A 37 year old woman was admitted to the hospital on March 20, 1946, for dilatation and curettage because of a suspected incomplete spontaneous abortion. The last menstrual period had occurred in January, 1946. The patient had

been well until 3 days before admission, when she had slight vaginal bleeding, suprapubic pain and passed a small piece of bloody tissue. Curettage yielded a large amount of hemorrhagic tissue which was composed of decidual tissue, without chorionic villi. Following the operation the patient appeared in good condition, but suddenly became markedly dyspneic and expired  $1\frac{1}{2}$  hours after operation. Death was attributed to a very rapid and massive intraperitoneal hemorrhage due to ruptured tubal pregnancy.

Section of the left Fallopian tube revealed a twin pregnancy; the embryos lay in distinct amniotic sacs separated by hemorrhagic placental tissue. The larger sac lay within the ampulla of the tube and contained a well-preserved male embryo, 3.3 cm. in length, which was estimated to be of  $3\frac{1}{2}$  months' gestation. The smaller sac was located near the fimbriated end of the tube and contained a well-preserved embryo of undetermined sex, 1.0 cm. in length and estimated to be  $7\frac{1}{2}$  weeks of age. Microscopic examination demonstrated that the 2 amniotic sacs were separated by a thick well-defined layer of chorionic villi. The marked disparity of size and developmental age of the fetuses appears to indicate superfetation. 1 figure.

## ECTOPIC PREGNANCY AS A DIAGNOSTIC PROBLEM

*(A Study of 100 Cases)*

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Canad. M. A. J., 56: 268-273, 1947

Of all pathological conditions arising in the female pelvis, ectopic pregnancy is probably the most commonly missed diagnosis. In the author's opinion diagnosis could be greatly facilitated if it were more generally realized that there are really two clinical pictures which differ considerably from one another. In one, the symptoms and signs are the result of the rapid loss of a fairly large quantity of blood into the peritoneal cavity—acute ectopic. In the other the loss is smaller and much slower—chronic ectopic. Since most textbooks fail to distinguish clearly between these two pictures, they confuse the searcher after truth, so that the average student comes to think of ectopic pregnancy as a condition that should be associated with amenorrhea and signs of a considerable internal blood loss, whereas amenorrhea is present in only about half of all cases and signs of large internal blood loss are present in slightly over a third. Furthermore, it is in the larger group where the internal blood loss is slight that the greatest diagnostic difficulty arises:

## THE ACUTE ECTOPIC PREGNANCY PICTURE

*Pain.* This is the most constant symptom and was present unmistakably in every one of the author's cases of acute ectopic pregnancy, of which there were 33. In all 33 cases the pain could be called severe. While there was no constant character to the pain, it usually began as a sort of colic, became sharp and cutting—sometimes agonizingly so—and then settled down to a rather severe ache. Usually felt in one or other of the iliac regions, in about a third of the cases it was most marked in the hypogastric region. Important things about the pain in ectopic pregnancy are: (1) it is always severe; (2) it does not need to be iliac in location; (3) it is always present.

*Abdominal examination.* Tenderness is a constant finding, usually most marked over the area of maximum pain. Rebound pain is sometimes present, sometimes absent. There is usually some resistance over the entire abdomen, greatest over the area of greatest tenderness, but in none of the author's cases was it a board-like rigidity. Important things in the abdominal examination are: (1) there is always tenderness and usually resistance; (2) percussion will practically always reveal movable dullness; (3) a mass is very seldom found and if found suggests a secondary abdominal pregnancy.

*Vaginal bleeding.* This is absent in a surprisingly high number of the acute cases, 9 out of 33. It is usually moderate in amount and about the equivalent of a menstrual period in three-quarters of the cases. Important things about the vaginal bleeding are: (1) it may not be present; (2) it is variable in amount and color; (3) it may only be a brownish stain that the patient has failed to notice.

*Vaginal examination.* Tenderness on pressure in the vaginal fornix on the side affected was present in all cases. Tenderness on moving the cervix was present in 25 of 33 cases. A pelvic swelling or mass was palpable in slightly over half the cases, 18 out of 33. Clotting of blood sufficient to cause a doughy mass in the pouch of Douglas was present in 5 cases. Most textbooks speak of enlargement of the uterus in ectopic pregnancy as though it were a useful sign; the author could detect it in only 9 cases and in his opinion it is a poor sign.

In 5 cases in which the patient did not know she was bleeding or staining per vaginam, he discovered it while doing the vaginal examination. Important points arising out of the vaginal examination are: (1) there is always tenderness on pressure in one of the vaginal fornices; (2) there is usually tenderness on moving the cervix; (3) failure to feel a tubal mass does not rule out the condition; (4) do not take the patient's word that she has no vaginal bleeding—look and see.

*Temperature.* In 23 of the 33 acute cases the temperature was normal or subnormal, the lowest 95°F. In the 10 cases in which it was raised the highest was 101.6°F. Important points arising out of the temperature are: (1) a normal or subnormal temperature is much more common in acute than in chronic ectopic; (2) a subnormal temperature is a useful confirmatory sign in a woman with severe low abdominal pain and signs of internal hemorrhage, since acute



ectopic is the only critical low abdominal condition likely to be associated with a subnormal temperature.

*Leucocyte count.* In only 2 cases was the white cell count below 10,000—lowest 5,400. In all others it was raised—highest 35,000.

*Amenorrhea.* In slightly more than half of the cases there was no history of amenorrhea, and this symptom is no more common in acute than in chronic ectopic. The longest period of amenorrhea in our series was 118 days—a case of secondary abdominal pregnancy. The shortest was 15 days which, in the author's opinion, may seem fantastic, but as far as he could learn from a careful questioning of this patient the period that occurred 15 days before the onset of her symptoms was a perfectly normal one. The author does not believe that textbooks stress sufficiently the fact that amenorrhea is a relatively unimportant symptom of ectopic pregnancy.

#### CHRONIC ECTOPIC PREGNANCY

Sixty-seven of the author's 100 cases were of the chronic variety and it was here that the greatest difficulty in diagnosis was encountered and the most mistakes made.

*Pain.* Usually this is severe enough to send the patient to her doctor but it has not the dramatic savagery of the acute variety. Important points about the pain are: (1) it is always present, although in some cases it may amount only to a discomfort; (2) it is not necessarily iliac in location.

*Abdominal examination.* Tenderness was invariably present and was usually most marked where the pain was severest. It varied greatly in severity and in some cases the mere touch of the hand was more than the patient could bear, while in other cases deep palpation was necessary to bring it out. Resistance was present in only 25 per cent of the cases. Important points in the abdominal examination are: (1) tenderness is always present in the low abdomen; (2) deep palpation may be required in some cases to elicit it; (3) if a tumor can be felt it is probably a secondary abdominal pregnancy, some accompanying pelvic tumor or a pelvic hematocele.

*Vaginal bleeding.* This is rarely absent being so in only 3 out of 67 cases. It varies considerably in character and amount. In some cases it was excessive enough to suggest a miscarriage, in others it was merely a brownish stain so slight in amount that in 10 of the 67 cases the patient did not know she had it. Important points about the vaginal bleeding are: (1) it is almost always present; (2) it may only be a brownish stain of which the patient is ignorant and which you will discover only when you do the vaginal examination; (3) since in half the cases the vaginal bleeding comes on at about the time the menstrual period is due, the patient will often misinterpret it to you as a period, either normal or abnormal.

*Vaginal examination.* The bleeding or brownish discharge will be noted. The cervix is usually tender when moved, but there is always tenderness on pressure in the fornix on the affected side. A tubo-ovarian mass was felt in 51 of 67 cases; was not felt in the others. Important points in the vaginal examination are: (1) very slight bleeding or brownish discharge of which the patient

## THE ACUTE ECTOPIC PREGNANCY PICTURE

*Pain.* This is the most constant symptom and was present unmistakably in every one of the author's cases of acute ectopic pregnancy, of which there were 33. In all 33 cases the pain could be called severe. While there was no constant character to the pain, it usually began as a sort of colic, became sharp and cutting—sometimes agonizingly so—and then settled down to a rather severe ache. Usually felt in one or other of the iliac regions, in about a third of the cases it was most marked in the hypogastric region. Important things about the pain in ectopic pregnancy are: (1) it is always severe; (2) it does not need to be iliac in location; (3) it is always present.

*Abdominal examination.* Tenderness is a constant finding, usually most marked over the area of maximum pain. Rebound pain is sometimes present, sometimes absent. There is usually some resistance over the entire abdomen, greatest over the area of greatest tenderness, but in none of the author's cases was it a board-like rigidity. Important things in the abdominal examination are: (1) there is always tenderness and usually resistance; (2) percussion will practically always reveal movable dullness; (3) a mass is very seldom found and if found suggests a secondary abdominal pregnancy.

*Vaginal bleeding.* This is absent in a surprisingly high number of the acute cases, 9 out of 33. It is usually moderate in amount and about the equivalent of a menstrual period in three-quarters of the cases. Important things about the vaginal bleeding are: (1) it may not be present; (2) it is variable in amount and color; (3) it may only be a brownish stain that the patient has failed to notice.

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There is divergence of opinion as to the severity of the risk incurred by pregnancy upon a patient with coarctation of the aorta. Assessment of this risk appears to depend mainly on 2 factors: (1) the ability of the heart muscle to withstand the increased circulatory load of pregnancy and labor in addition to the stress of the congenital lesion; and (2) the integrity or otherwise of the vascular system. In Abbott's series, congestive failure was commoner in the older age groups, and vascular accidents in the younger patients, and it is reasonable to suppose that longstanding hypertension, together with minor infections, weakens the myocardium more after middle life than before. Clinical reports indicate that patients with coarctation support the stress of increased circulatory burden of pregnancy remarkably well. Few cases have been described as terminating in congestive cardiac failure during pregnancy or shortly after delivery. Hamilton and Thomson, with an extensive experience with cardiac patients in pregnancy, give a good prognosis, but advise a regime of restricted exercise with careful guard against unnecessary strains. In only one of their 4 cases of coarctation was the patient delivered by cesarean section.

On the other hand, Mendelson (1940) takes a more gloomy view, advising induction of abortion and sterilization if the patient is seen early in pregnancy. He found reports of 5 cases which died during pregnancy or shortly after delivery, and of 10 patients whose symptoms were exacerbated during pregnancy. Three of the 5 deaths were due to rupture of the aorta. Walker and many authors, particularly Mendelson, believe that labor should be avoided and cesarean section performed at term.

The hypertension which complicates coarctation does not appear to carry with it any increased danger of pre-eclampsia which, if it occurred, would be of grave import to the patient with coarctation. Hypertensive encephalopathy occurred in one of Hamilton and Thomson's 4 patients, but she was delivered normally.

The case reported in this paper occurred in a 26 year old gravida i who, when examined by the authors, had a regular pulse, rate 84; right arm blood pressure 208/104 and left arm blood pressure 190/108. There was marked pulsation in the suprasternal notch and visible pulsation in both infrascapular regions. Large pulsating vessels could be felt along the medial scapular borders. The apex beat was diffuse. There was a systolic murmur at the base and conducted upward to both sides of the neck. Chest x-ray showed moderate cardiac enlargement with hypertrophy of the left ventricle, absence of the normal aortic shadow and notching of the lower borders of the 4th and 5th ribs. An E. C. G. showed left ventricular preponderance. The uterus was enlarged to the size of a 14 weeks' gestation. Abdominal aortic pulsations were not felt.

The patient restricted her activities to a minimum. After her initial period of one week's rest in bed while under observation, her symptoms of headache, breathlessness and giddiness improved, so that further bed-rest did not appear necessary until near term. The blood pressure never exceeded that at the initial examination. Obstetrically, the pregnancy was normal.

is unaware may be discovered by the vaginal examination; (2) inability to feel a tubo-ovarian mass does not rule out ectopic pregnancy; (3) there is always tenderness on pressure in the fornix on the affected side.

*Temperature.* This was almost always raised; it was normal in only 6 of 67 cases. The subnormal temperatures which are fairly common in acute ectopic are not present in chronic ectopic. The temperature is usually around 100, but the highest in the author's series was 103. Important points about the temperature are: (1) it is almost always above normal and practically never subnormal; (2) a temperature as high as 103° does not rule out ectopic.

*Leucocyte count.* In only 13 of 67 cases was it below 10,000. It does not go as high as in the acute condition. In the author's series the highest was 24,000 and the average about 12,000.

*Amenorrhea.* As in acute ectopic this symptom was absent in about half the cases. In other words the history of amenorrhea is not necessary for the diagnosis of chronic or acute ectopic.

The author now considers certain other diagnostic aids such as examination under anesthetic, needling the pouch of Douglas, biological tests, dilatation and curettage, hysterosalpingography, history of previous pelvic inflammatory disease, history of sterility, presence of accompanying disease and history of previous ectopic pregnancy. With the exception of the last, he regards these as less valuable than the signs and symptoms enumerated above. In his 100 cases there was a history of previous ectopic pregnancy in 7; when this history was obtained the diagnosis was made quickly and correctly, the patient making it herself in 3.

In the 100 cases under consideration the author's final preoperative diagnosis was ectopic pregnancy in 88. Of the 12 cases in which a mistaken diagnosis was made, 2 were of the acute variety and 10 of the chronic. The erroneous diagnoses in the 2 acute ectopics were ovarian cyst with twisted pedicle and acute appendicitis. Those in the 10 chronic cases were chronic pelvic inflammation in 5 cases and acute appendicitis, pelvic abscess, ovarian cyst with twisted pedicle, chronic pelvic abscess and benign uterine bleeding.

## COARCTATION OF THE AORTA IN ASSOCIATION WITH PREGNANCY (A REVIEW OF THE LITERATURE WITH DESCRIPTION OF A CASE)

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*St. Helier County Hospital*

J. Obst. & Gynaec. Brit. Emp., 54: 91-96, 1947

To the 40 cases of coarctation of the aorta associated with pregnancy in the literature, the authors add one case of their own and present brief notes on 2 cases yet unpublished, bringing the total to 43.

in 9 patients this occurred after the twelfth week. Seventeen patients (14 per cent) miscarried, 10 of them after the third month. It is of note that the greatest proportion took place after the 12th week, a point emphasized by Pierson. Premature labor took place on 10 occasions (twice in a twin pregnancy), and 6 of the 12 infants were lost. Thus, including the cases of abortion and premature labor, premature interruption of pregnancy occurred in 22.1 per cent of cases, with a fetal mortality rate of 79.3 per cent.

Watson regarded red degeneration as the most frequent complication, and this is confirmed in the present series where 2 patients (18 per cent) presented this complication at any time from the beginning of gestation until term. All cases except 2 were treated conservatively; laparotomies were performed on 4 occasions. It is concluded that conservative treatment is preferable, and that myomectomy should, if possible, be avoided. The risk attached to the operation is about 0.5 per cent greater in pregnancy. It was performed only 5 times in this series.

There were 5 cases (4.1 per cent) of antepartum hemorrhage for which no cause could be found. Two patients carried normally to term, cesarean section was performed in 2 cases at the 35th and 38th week, respectively, and one patient had a breech delivery.

Hysterectomy was performed before the period of viability in 6 cases; on 4 occasions the pregnancy had not been diagnosed. Severe epilepsy and psychological reasons necessitated the other 2 operations. Another pregnancy was terminated for severe thyrotoxicosis.

Of the 88 cases delivered in this hospital, 50 (57 per cent) had normal labors, although 7 were premature. Uterine inertia, defined as a first stage of labor lasting more than 48 hours, was present in 8 cases (9.1 per cent). This incidence, although far greater than in unselected cases, was less than might have been expected from a study of other records.

Delay in the second stage, myomectomy during pregnancy and deep transverse arrest were the indications for the forceps extraction of 11 infants (12.5 per cent). Cesarean section was performed in 22 cases (25 per cent), the most frequent indications being the patient's age, uterine inertia, unfavorable presentation and obstructing fibroid.

Of the 66 vaginal deliveries, 2 patients, or 3 per cent, had postpartum hemorrhage, and one manual removal of the placenta was necessary. Pierson reported that 33.6 per cent of his patients had postpartum hemorrhage.

There were 6 breech (one in a twin pregnancy) and 2 shoulder presentations at term.

Puerperal morbidity was noted in 7 patients, but in only 2 instances could this be attributed to the presence of fibroids.

There were 3 maternal deaths, one from postoperative shock following cesarean section, one from paralytic ileus following cesarean section and myomectomy, and one from bronchopneumonia following craniotomy.

Of 113 patients who were looked after by the hospital, only 79 had healthy

She was admitted at the 37th week for further rest until delivery. Three days before the expected date of confinement an elective low classical cesarean section was performed under local procaine anesthesia. The abdominal wall was more vascular than usual but uterine blood loss was normal. Palpation of the abdominal aorta showed the vessel to be pulsating feebly and of about half normal size. The patient stood the operation well and the infant (9 lb., 6 oz.) was in excellent condition.

Six months later the patient stated that she was less breathless than before pregnancy. The systolic murmur was much less pronounced. The patient appeared to have been quite unaffected by the pregnancy.

It is concluded that pregnancy is not contra-indicated in most of these patients though adequate spacing and avoidance of late childbearing seem wise. The writers favor delivery by cesarean section.

(This article, as abstracted above, is a sane summation of our present-day knowledge of this serious complication of pregnancy. The one patient with coarctation of the aorta whom I have seen in pregnancy and who has just been carried through, did very well but there were definite signs of hypertensive encephalopathy in the last 3 months, especially severe headaches, dizziness and arm numbness. Because of this, she had to stay in bed the last 6 weeks. Her blood pressure varied little throughout gestation, averaging 190/115 in both arms. I delivered her by section 2 weeks before term and tied her tubes. It would appear that the way of wisdom in these cases lies somewhere between the gloominess of Mendelson and the optimism of Hamilton; and this seems to be the opinion of Baber and Daley, as well.—Ed.)

## FIBROIDS IN PREGNANCY (AN ANALYSIS OF 122 CASES TREATED IN UNIVERSITY COLLEGE HOSPITAL, LONDON, FROM 1934 TO 1945)

E. W. C. BUCKELL

J. Obst. & Gynaec. Brit. Emp., 54: 70-76, 1947

From the frequency of complications in pregnancy, labor and puerperium, and the high fetal and maternal death-rate, it is concluded that the presence of fibroids in pregnancy is a serious complication.

Of 15,313 pregnancies at this hospital over the past 12 years, there have been 122 cases with fibroids, an incidence of 0.79 per cent. Of the 122 cases, 81 were primigravidae and 41 were multiparae. The average age of all cases was 34.3 years, the ages varying from 25 to 46 years. More than 20 per cent of the patients were primigravidae of 36 years of age or more.

In this series of cases, pregnancy was normal in only 49 (40 per cent). Fifteen of 102 cases where records are available (14.7 per cent) gave a history of at least one miscarriage. Eleven cases (9.8 per cent) had a threatened abortion;

## **PATHOLOGY OF LABOR AND PUERPERIUM**

### **THE USE OF RADIOLOGY IN PREDICTING DIFFICULT LABOUR**

**J. C. MOIR**

*University of Oxford*

*J. Obst. & Gynaec. Brit. Emp., 53: 487-497, 1946*

The author has studied 800 obstetrical cases radiologically and has devised a systematic approach by which the obstetric value of the pelvis may be assessed with relative ease and with a fair degree of accuracy.

Using the isometric method of pelvic examination, three planes are visualized. The lateral projection is felt by the author to be the most important. This is taken with the patient in the upright position and with the antero-superior iliac spines pressed against two wooden pegs which have been so placed as to insure correct positioning of the patient. The lateral picture gives information as to the true and false promontory, the inclination of the pelvic brim, the relation of the fetal head to the brim and the degree of engagement, the biparietal diameter, the length and shape of the sacrum, the size and shape of the sacroiliac notch, the length of the lower antero-posterior diameter and the length of the posterior sagittal diameter of the outlet.

A second projection is the supero-inferior view of the pelvic inlet and is obtained by placing the patient on the ray table in a reclining position so that the inlet is parallel to the table top. In the patient at term better pictures are obtained with the patient in the dorsal position with a pad under the small of the back to cause lordosis. Though the shape of the brim is lost, the bispinous diameter can be measured more accurately and the available transverse diameter can be measured with a fair degree of accuracy. This is the diameter that intersects the conjugate at midpoint.

The third film concerns the pubic arch. This is taken with the patient sitting on the cassette and bent well forward while the tube is centered vertically over the ischial tuberosities. The author evaluates the arch obstetrically by measurement of the pelvic angle.

X-ray cephalometry is more difficult than pelvimetry but despite the awkwardness of the object to be measured precision in such measurements can be attained in many instances. The shortest diameter of the skull is used for this work as it is the one always seen on x-ray. X-ray studies before term must make allowances for growth of the head. Dr. Moir allows 2 mm. per week for growth affecting the shortest diameter. The moulding of the head varies greatly, sometimes as much as 4 to 5 mm. However, it may be dangerous to attempt to predict the course of labor if more than 2-3 mm. disproportion exists in any dimension. Repeated x-ray studies during labor may be of value in determining the extent of moulding. 10 plates. 6 figures.

children. Fourteen per cent aborted and the fetal and neonatal death-rate was 11.1 per cent. Five infants were born macerated, one was a dead birth following premature labor complicated by a prolapsed cord, 2 were stillbirths (one following manual dilatation of the cervix and forceps delivery, and one a breech extraction), and there were 2 neonatal deaths, one following premature labor, and the other a forceps delivery following a prolapsed cord. It is concluded that cesarean section will usually secure a living child, and that it should be seriously considered in all elderly primigravidae and in all other patients where there is an additional complication.



ever, that the prediction of dystocia is surest when a fault is revealed in the brim graph. This may be erroneous when there is a high inclination of the pelvic brim, when the sacrum lacks the full curve from above downward, or when there is malposition of the head.

Radiology has been especially helpful under certain conditions. This is true when the head is high at term and a contracted pelvis is suspected. Intrapartum radiology is of benefit in abnormal or prolonged labor. Cephalometry helps to establish the degree of fetal development in post-maturity and prematurity. In breech presentation when the head cannot be gauged directly there is special reason for radiological examination. It may also be helpful in suspected hydrocephaly. It may solve the problem of home or hospital delivery. The fear of obstetric difficulty can be alleviated by radiological examination, especially in those cases which have shown previous difficult labors.

## RECOGNITION OF MIDPELVIC CONTRACTION

W. C. ELLER AND W. F. MENGERT

*Dallas, Texas*

*Southwestern Medical College*

*Am. J. Obst. & Gynec., 53: 252-258, 1947*

Although occasional reference has been made to the obstetric significance of the midpelvic plane for at least 15 years, the subject continues to receive scant attention and the majority of recent writers ignore it. By way of documenting the great clinical importance of midpelvic contraction, the following case is reported:

F. M., hospital number W-21701, a 33-year-old Negro primigravida, was first seen on January 22, 1945. The pelvic measurements, although small, were within normal limits. As obtained in the outclinic, they were: (inlet) interspinous 25.0 cm., intercrystal 26.5, external conjugate 19.0, diagonal conjugate 11.75 (outlet) bisischial 8.5, posterior sagittal 8.0, and anteroposterior 11.5 centimeters. On the basis of these measurements, delivery by the vaginal route was chosen. She was admitted in active labor on June 16, 1945, with the cervix almost half dilated and nearly effaced, the membranes ruptured, and the vertex engaged and presenting in left occipito transverse position. Cervical dilation progressed to 8 centimeters during the next two hours, but was not completed until fifteen hours later despite adequate uterine contractions. During this time, the fetal heart tones became inaudible. Moreover, there was practically no additional descent of the vertex, which was arrested two fingerbreadths below the spines. Sudden depression of the blood pressure to 80/60 from previously normal levels motivated decision to deliver after application of restorative measures. A very difficult and traumatizing extraction following craniotomy

## THE USE OF RADIOLOGY IN PREDICTING DIFFICULT LABOURS

J. C. MOIR

*University of Oxford*

J. Obst. &amp; Gynaec. Brit. Emp., 54: 20-33, 1947

Lecture 2: Forecasting the Course of Labor. Among the various anatomical features revealed by radiography, the author mentions the following as indicating a good obstetrical pelvis. The obstetric conjugate is adequate in size. This diameter is measured on the lateral radiograph from the inner margin of the upper part of the pubic bone to the nearest part of the sacrum. This value should be between 11.3 and 12 cm. The sacrum shows a full even curve from above downward. The pubic bone and its descending ischial rami are nearly parallel to a line joining the sacral promontory to the sacral tip. Any marked convergence from above downward indicates the possibility of outlet contraction. The transverse diameter of the brim is adequate, and the posterior segment of the brim outlet is well rounded. The transverse diameter of the brim ranges between 12.6 and 13.2 cm. The limbs of the pubic arch diverge widely enough to accommodate the head with little wastage of space under the apex of the arch. A narrow arch will force the head backward and lead to perineal tears or disproportion if the coccyx or sacrum is foreward. The fetal head is moderate in size relative to the pelvis and is favorable in position.

The interpretation of radiographic findings calls for care and judgment. Measurement of the brim area may simplify these interpretations. When the brim area is reduced to 90 sq. cm. the level of uncertainty is reached and a brim area of 110 sq. cm. will pass 99 per cent of heads. Pelvic charts or tracings made with the Thoms pelviscope can show the true size and shape of the pelvic brim. Adding the outline of the flexed head to this chart increases its usefulness. The author points out, however, that not one, but 3 planes should be considered. These are the brim, the pelvic cavity at the level of the ischial spines and the outlet. For this reason he has devised the graph method to aid in interpretations. Three types of charts were devised, one for the brim, one for the cavity and one for the outlet. In each, the anterior posterior dimensions were marked vertically and the transverse dimensions horizontally. By pin-pointing a spot on each chart, the main facts regarding the size and shape of any particular pelvis could be recorded. Separate sets of charts were made for each size of fetal head from 9.0 cm. to 9.9 cm. biparietal diameter. Analysing each case by this method, it was found that a dividing line could be marked out on each chart separating the easy deliveries from the difficult deliveries. Having marked out the dividing line on each individual chart, it was then possible to combine the charts and draw up a single set of 3 charts showing the dividing lines for easy and difficult labors for each size of fetal head. These were used as key charts in predicting the outcome of questionable cases. It remains true, how-

ever, that the prediction of dystocia is surest when a fault is revealed in the brim graph. This may be erroneous when there is a high inclination of the pelvic brim, when the sacrum lacks the full curve from above downward, or when there is malposition of the head.

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was necessary to effect delivery, and resulted in a bladder perforation unrepaired at the time because of the patient's precarious condition. The assembled fetal parts weighed 3,134 grams. The puerperal course was uneventful except for a vesicovaginal fistula 4 millimeters in diameter. After the event, roentgenographic mensuration revealed a severely contracted midpelvis, as depicted in figures accompanying this paper. Had this knowledge been available before the onset of labor, it is probable the patient would have been delivered by the abdominal route, despite antepartum engagement of the head.

For obstetric purposes the plane of the midpelvis extends from the inferior margin of the symphysis pubis, passes through the ischial spines, and touches the sacrum in the neighborhood of the junction of the fourth and fifth vertebrae, according to individual sacral conformation. Average midpelvic measurements may be accepted as follows: transverse (interspinous) 10.5 cm., anteroposterior (from the lower border of the symphysis to the fourth to the fifth sacral interspace) 11.5 cm., and posterior sagittal (from the midpoint of the interspinous line to the same point on the sacrum) 5.0 cm. There is no satisfactory method of manual mensuration of the midplane diameters.

Obviously, midpelvic contraction may be produced by reduction of either the transverse or anteroposterior dimensions, or of both. Transverse narrowing may result from prominence of the ischial spines, and narrowing of the space between the lateral pelvic walls. These factors may augment or nullify each other. Evaluation of the midpelvic capacity depends primarily upon consideration of the interspinous and the posterior sagittal dimensions as emphasized by Guerriero and his associates (South. M. J., 33: 840, 1940).

Adequate recognition of midpelvic contraction demands roentgenologic mensuration. In the method of pelvimetry described by Snow and Lewis (1940) exposure of the films, a flat anteroposterior and a lateral view, is simple, and measurements corrected for distortion can be obtained in a few minutes with a specially devised slide rule. Roentgenographic pelvimetry is indicated in the presence of any one of the following:

A. History

1. Difficult labor, especially midforceps delivery.

2. Unexplained stillbirth.

B. Palpation

1. Prominent ischial spines.

2. Sacral deformity. Any, but especially forward angulation.

C. Manual mensuration.

1. Inlet

a. Ability to touch sacral promontory on vaginal examination.

b. External measurements below average, i.e., interspinous 23 centimeters or less, intercrystal 26 centimeters or less, external conjugate 17 centimeters or less.

2. Outlet

a. Bisischial 8.5 centimeters or less.

b. Sum of bisischial and posterior sagittal 15.0 centimeters or less.

D. Nonengagement of fetal head at term in a primigravida.

Obviously, maximal experience with the incidence and extent of midpelvic contraction can be most rapidly gained by the universal employment of x-ray pelvimetry. Since this is not always practicable, suggestions are made in the present paper whereby midpelvic contraction can be suspected by current manual methods. The obstetrician is thus enabled to isolate a relatively small group of patients most likely to present midpelvic contraction. These patients can be submitted to further study with the roentgen ray. When this is done, it will obviously be convenient to measure all diameters of the three pelvic planes from the films. Previous experience of others leaves no doubt that midpelvic contraction is neither infrequent nor innocuous, and that it may produce dystocia. To date, no one has published data on a sufficient number of patients to enable formulation of definite criteria. The most acceptable suggestion has come from Guerriero and associates that when the sum of the transverse and posterior sagittal equals 13.5 cm. or less, dystocia may be expected. If a sufficient number of clinics study the problem, principles of management based on accurate antenatal determination of midpelvic capacity will soon be formulated. Then, unforeseen midpelvic arrest, unexpectedly difficult midforceps operation, and unexplained stillbirth and neonatal death due to midpelvic contraction will become infrequent.

(This is an especially welcome article since it draws attention in graphic fashion to one of the great oversights in obstetrics, namely, the long neglect of the inter-ischial spinous diameter. It is curious that contractions of the mid-pelvis, which are common and which in every-day obstetrics probably account for more difficult forceps operations than diminutions in any other diameter, should have received so little attention. It is true that DeLee once devised a pelvimeter to measure this distance and regarded it as one of the essential internal dimensions. Likewise, in 1930, Hanson recommended a pelvimeter for the same purpose and in 1936 published a most instructive and comprehensive paper on the subject, a paper which deserves to be read and heeded much more than it apparently has been. (*Am. J. Obstet. & Gynec.*, 32, 385, 1936.) Since then Caldwell, Moloy and D'Esopo, Thoms and Schumacher, and others, have emphasized the great clinical significance of this measurement. Nevertheless, notwithstanding all this good advice, it would be no exaggeration to say that for every 100 gravidae who have their inter-ischial tuberos diameter measured to-day scarcely one has a measurement made of the interspinous distance,—this, despite the fact that we are dealing here with the region which has long been designated as the "plane of the least pelvic dimensions."

The neglect of this measurement in the past has been due no doubt to the difficulty of ascertaining it manually. Hanson had no trouble apparently in estimating this dimension with his pelvimeter, but it has been my experience that the region of the ischial spines is especially tender and that the manual procedure in general is not satisfactory. As Eller and Mengert point out, "Adequate recognition of midpelvic contraction demands roentgenologic mensuration."

From a practical viewpoint the great importance of midpelvic contraction lies in the difficulty, often the surprising difficulty, which it can impose on any forceps operation performed before the head has reached the pelvic floor. The distance from the biparietal plane of a term baby's head to the vertex is rarely less than 3 cm. and if the infant is large and has much caput, it may exceed 4 cm. Obviously, then, when the vertex on rectal examination is thought to be 3 cm. below the spines, the chances are that the biparietal diameter has not quite passed or at best is just passing the interspinous plane. Any experi-

enced forceps operator knows that when the head is actually on and bulging the perineum, that is, when the vertex is 4 to 5 cm. below the spines, a little finger and wrist traction is all that is needed for delivery. Here the biparietal diameter has passed the spines. On the other hand, when the head is 3 cm. or less below the spines, the pull may still be easy, but occasionally a surprising amount of traction is required. Here the biparietal diameter has not yet passed the spines. Having carried out routine X-ray pelvimetry on my private patients for a number of years, I have been interested in correlating the interspinous dimensions with the degree of traction necessary in forceps delivery. Of course, such factors as the size of the baby, posterior positions and the posterior sagittal of the midpelvis have to be weighed also in the balance, but these factors being equal I am certain that when forceps are applied before there is definite perineal bulging, the degree of traction required steps up sharply and regularly as the interspinous diameter descends from 10.0 to 9.0 cm.

As Eller and Mengert point out, there are insufficient data at the present time on the course of labor in the presence of midpelvic contraction and only when such data become available can a sound program of management be formulated. Meanwhile the following general principles, gleaned through trial and error, may prove of some help:

1. To spot all cases of midpelvic contraction, routine X-ray pelvimetry is necessary. However, as Eller and Mengert point out, the relationship between the intertuberous and interspinous diameters is sufficiently constant so that contractions of the latter dimension will seldom be missed if X-ray pelvimetry is limited to patients whose intertuberous diameter is 8.5 cm. or less (nothing added for skin and fat). But let it be remembered here that midpelvic contraction is a common condition, Hanson finding interspinous diameters of 9.5 cm. or less in 16.1 per cent of 1120 consecutive patients.

2. Cesarean section (it would have to be elective of course) is rarely necessary because of midpelvic contraction although, on hind sight, it would obviously have been the procedure of choice in Eller and Mengert's case; and during the past five years we have performed two sections in extreme examples of this condition. To justify abdominal deliver,—indeed, to establish any kind of prognosis in these cases—a number of factors other than the interspinous diameter have to be considered, especially the posterior sagittal of the midpelvis and the size of the baby. I agree with Guerriero's rule that when the sum of interspinous and posterior sagittal diameters (normally, 10.5 and 5.0 equals 15.5) falls to 13.5 cm., dystocia may be expected. When the figure falls below 13.0 with an infant estimated to weigh 3600 Gr. or more (8 pounds or more), grave dystocia is so likely to occur that abdominal delivery would probably be indicated, but such extreme degrees of midpelvic contraction are rare.

3. In the management of labor complicated by midpelvic contraction, the main injunction—the inviolable injunction—is to allow the natural forces to push the biparietal diameter through the interspinous obstruction. To my discomfiture I have had this rule drilled into me on several occasions, as follows: after pulling on the forceps in such cases without any result, I have removed the blades and asked an assistant to exert supra-fundic pressure. Forthwith the head has descended rather promptly to the pelvic floor. The same has occurred when, after forceps attempts in these cases, the patient has been allowed to awaken from her anesthetic and exert her natural forces. Apparently there is something about forceps which works havoc when applied to a head whose greatest diameter has not yet passed a contracted midpelvis. Hanson has observed the same difficulty with forceps and has explained it on two grounds: (1) Forceps pull destroys flexion whereas pressure from above increases it. (2) The few millimeters occupied by the thickness of the blades diminishes still further the available space for the passage of the baby's head.

In sum, patience, time and abstention from interference are the key-notes of success. Only when the head has been allowed to descend until the perineum is bulging and the vertex actually visible to the size of a quarter, can one be certain that the head has passed the obstruction and only then is it safe to apply forceps. If necessary, supra-fundic pressure can be used with pains to help attain this end. It is far better than forceps in these cases.

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In sum, patience, time and abstention from interference are the key-notes of success. Only when the head has been allowed to descend until the perineum is bulging and the vertex actually visible to the size of a quarter, can one be certain that the head has passed the obstruction and only then is it safe to apply forceps. If necessary, supra-fundic pressure can be used with pains to help attain this end. It is far better than forceps in these cases.



4. The incidence of persistent occiput posteriors is increased in these cases. Here again forceps for the purpose of rotation will only lead to trouble and trauma. Hanson recommends manual rotation and forceps but in my own experience additional time in the second stage, supra-fundic pressure and forceps delivery of the occiput as such after it has reached the perineum, have yielded more satisfactory results.—Ed.)

## AN ANALYSIS OF DEATHS FROM POSTPARTUM HEMORRHAGE

C. T. BEECHAM

*Philadelphia, Pa.*

*From the Maternal Welfare Committee of the  
Philadelphia County Medical Society*

*Am. J. Obst. & Gynec., 53: 442-452, 1947*

This analysis is based on 168 deaths from postpartum hemorrhage, representing an incidence of 8.45 per cent of the total in 15 years. The average is 11.2 deaths from this cause per year in Philadelphia. The Maternal Welfare Committee has judged 121, or 72 per cent, of these deaths to be preventable, and 62.5 per cent were judged preventable due either to errors in judgment or technique on the part of the attending obstetrician. In 9.5 per cent of cases the patient, either through carelessness or ignorance, was held responsible for her own death.

The average age of the women dying from postpartum hemorrhage was 31.5 years (ranging from 15 to 44 years). Eighty-four per cent of the group were white; 16 per cent were Negro. Labor began spontaneously and the membranes ruptured spontaneously in the average case. The average duration of labor was 14 hours. Twenty-one of the patients were delivered and died at home, while 4 were delivered at home and died in a hospital.

One-third of the patients delivered spontaneously, while the remaining two-thirds had various obstetric operations; the vast majority of the operations were considered not indicated. Low forceps were employed in about 20 per cent of cases, manual dilatation of the cervix and version in about 15 per cent, cesarean section in about 12 per cent, midforceps in about 8 per cent and breech extraction in about 6 per cent. Manual dilatation of the cervix and version was uniformly condemned. Complications ran higher where interference was practiced, although the spontaneous delivery group was not free of complications.

Ether was used in over 50 per cent of cases and nitrous oxide in slightly over 10 per cent. Twenty-nine per cent of the patients had no anesthesia and 33 per cent delivered spontaneously. Therefore, from these figures, one could

state that a patient delivering spontaneously without anesthesia is just as liable to hemorrhage as the patient with an operative delivery and general anesthesia.

In one third of the cases the patient received an oxytocic at the beginning of the third stage of labor and at completion of placental delivery. The remainder had oxytocics only at the end of the third stage. Inhalation anesthesia for delivery was continued until the placenta was delivered. Normal expression of the placenta took place in two-thirds of the group, manual removal in about 13 per cent, removal at cesarean section in about 12 per cent and late manual removal in less than 5 per cent. In about 7 per cent of cases a retained placenta was not delivered.

As to etiology of postpartum hemorrhage, 72 per cent of the cases fell into the atonic uterus group. In 44.64 per cent no cause for the uterine atony could be determined. There were 11 cases (6.54 per cent) of inversion of the uterus; none had the uterus replaced. Other causes listed were ruptured uterus, 4.16 per cent; lacerated cervix, 4.16 per cent; and myoma uteri, 2.38 per cent.

As to treatment, 41.5 per cent of the patients were allowed to bleed to death with nothing more than uterine massage and oxytocics being used. Intravenous fluids were given to 44.5 per cent, while 25 per cent received blood transfusions. Plasma was used in only 12 per cent. Uterovaginal packing was used in only 26.5 per cent of cases. Late packing, when the patient was practically moribund, was used in 16 per cent, while late transfusions were employed in 9.5 per cent. Only 2 patients received more than 500 cc. of blood before death.

The average time between delivery and death was  $5\frac{1}{2}$  hours; there was usually ample time for adequate treatment.

The entire series is impressive from the standpoint of almost total disregard for the necessity of combating anemia in pregnancy as an aid in treatment of possible postpartum hemorrhage. Another prophylactic measure is routine typing of all prenatal patients. During labor, little attention was directed in this series toward judicious sedation or measures employed to combat fatigue and exhaustion. Ill-advised operations and meddlesome obstetrics were further etiological factors. Poor choice and use of anesthesia and poor management of the third stage of labor were obvious causes. All too often there was failure to recognize hemorrhage in time, continuous "seepage" or "oozing" of blood being unnoticed by attendants. Finally, there was insufficient use of oxygen, packing and whole blood to combat hemorrhage. 7 figures.

PITUITARY EXTRACT IN UTERINE INERTIA:  
IS IT JUSTIFIABLE?

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*Johns Hopkins University and Hospital*

*Am. J. Obst. & Gynec., 53: 432-441, 1947*

For the past 5 years, carefully selected cases of uterine inertia have been treated with minute, intramuscular doses of pituitary extract. This agent was used in 463 cases or in 5.3 per cent of the deliveries occurring in this period. Of these 463 cases, 230 were private and 233 were ward cases; practically all of the latter were examples of real, often severe, inertia. Uterine inertia is defined as such a degree of sluggishness of uterine contractions that (1) in the first stage the cervix shows no change over an 8-hour period and (2) the uterine wall is easily indentable at the acme of each pain; and in the second stage sluggishness of uterine contractions to such a degree that the head neither rotates nor descends over a 2-hour period with the uterine wall easily indentable at the acme of each pain.

The most notable benefit from the administration of pituitrin to the ward cases was the reduction in the incidence of midforceps, from 1 in every 200 deliveries in the nonpituitrin period to 1 in every 1000 deliveries in the period in which pituitrin was used. There was a 60 per cent reduction in the frequency of Dührssen's incisions, and more than a 50 per cent reduction in the incidence of cesarean section.

Among the patients whose babies were alive on admission, the stillbirth and neonatal death rate was 3.0 per cent. All these 14 deaths occurred in the ward series; 9 of them appeared to be the direct result of pituitrin stimulation. In one case fetal death followed uterine rupture; in 5 of the remaining 8 cases, unrecognized or disregarded, borderline disproportion was present, emphasizing the high fetal mortality which may be expected if pituitrin stimulation is used in the presence of the slightest degree of disproportion.

There was one maternal death (postpartum eclampsia) in the pituitrin series, in no way associated with the use of this agent. There was one case of uterine rupture in a 44 year old white woman, Para VIII, following repeated injections of 1 minim of pituitary extract at 30 minute intervals. This accident occurred early in the series and illustrates one of the most important contraindications to pituitary extract, namely, great parity. The patient made a satisfactory recovery after hysterectomy.

On the basis of this experience, the author is inclined to believe that the balance lies slightly in favor of pituitary extract, *provided* that certain rigid rules be observed. These are: that the case be one of real, primary inertia; that

the patient be actually in labor, not in false or prodromal labor; that there be no mechanical obstruction to easy delivery, as attested by x-ray of the pelvis and fetal skull; that patients of great parity must not be given pituitary extract; that the condition of the fetus be good; that the obstetrician observe and time the first contraction after administration of the drug and give inhalations of ether if it lasts longer than 3 minutes; and that *the initial dose not exceed  $\frac{1}{2}$  minim.* If necessary, the dosage may be increased to 1 minim, but to no more than 1 minim at a time. Thirty minutes must elapse between injections. When there is doubt as to whether a given case meets these requirements, pituitary extract should not be given.

## MATERNAL PULMONARY EMBOLISM BY CONTENTS OF THE AMNIOTIC FLUID

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Am. J. Obst. & Gynec., 53: 303-306, 1947

This unusual type of embolism is manifest at autopsy by the microscopic appearance of mucus, vernix, lanugo hair and meconium in the arteries, arterioles and capillaries of the lung. Ten cases have been reported in the literature. The author presents the eleventh case. In all cases the diagnosis has been made at necropsy.

A 33 year old woman, white, para i, gravida ii, was admitted with ruptured membranes on March 15, 1946; the expected date of delivery was March 4, 1946. The first pregnancy had been uncomplicated. Examination revealed that the patient was an apparently normal term pregnancy. The blood pressure was 100/72; temperature, 36.2 degrees C.; pulse, 88; respirations, 20. The fetus was in the right occipitoanterior position with the head floating, and the fetal heart was detected in the right lower quadrant. The cervix admitted one finger on rectal examination.

The patient's prenatal record was uneventful, with a normal pelvimetry, negative serology, no toxemia, and no past history of systemic diseases.

After admission, the patient began to have irregular pains, but these ceased shortly, and no further dilatation occurred in the first 18 hours. At 10 P.M., March 17, castor oil induction was initiated. Four hours later labor of moderate severity began with an expulsion of 30 cc. of blood while on the bedpan. No further bleeding was noticed until delivery. The fetal heart was last recorded at 9 P.M., March 17. At 4 P.M., March 18, the patient complained of chilli-

ness, and her temperature was 38.5 degrees C. At 5:30 P.M. the temperature was 40.3 degrees C., and slight bleeding from the gums was noticed. An intravenous injection of 1500 cc. of 5 per cent glucose was started. At 7 P.M. the temperature was 40.9 degrees C., and examination of the heart showed the presence of a harsh, blowing systolic murmur heard over all areas. Lung examination was negative. There was marked bleeding from the mouth. Uterine contractions were severe. At 8 P.M. the patient was taken to the delivery room; the skin was cooler and mottled, and the blood pressure was 74/34. The pulse was weak and rapid, the respirations rapid and shallow.

At 8:45 P.M., after 17 hours and 45 minutes of irregular dry labor, and 72 hours and 15 minutes of ruptured membranes, a stillborn fetus was spontaneously delivered, and very little blood was behind the placenta. There was an increasing amount of blood in the mouth at this time. Auscultation of the lungs revealed coarse, moist rales. Respirations ceased just as a cut down was completed for whole blood. Intracardiac adrenalin and oxygen were ineffective.

The microscopic diagnosis of the lungs was: (1) acute passive congestion of lungs, slight; (2) edema of lungs, slight; (3) multiple emboli of intrinsic blood vessels of lungs by mucus, and epidermal squamæ (vernix, lanugo hair and meconium); and (4) discrete thrombo-embolism of pulmonary vessels. The final pathologic diagnosis was: extensive pulmonary embolism by amniotic material; term delivery; intrapartum death; stillbirth.

In this case embolism was mentioned clinically, but was ruled out because the patient complained of no cough, no chest pain, or discomfort. The cardinal signs of embolism were absent until immediately before death. In consideration of the confusion of signs and symptoms, it was quite evident that clinical diagnosis was most difficult.

## TREATMENT OF BREAST ABSCESES WITH PENICILLIN

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Brit. M. J., 2: 845-848, 1946

During the years 1943 and 1944 there were 36 cases of breast abscess at this hospital. These were divided into a series of 18 women treated with a combination of intramuscular and local penicillin, and a second control series of 18 women treated with present accepted methods. It was found that the average healing time in penicillin-treated cases was reduced to half that in the controls.

The 2 series of cases were simultaneous, and extraneous factors could not be said to have favored the penicillin group. No case was accepted for investigation unless a well-defined, tender and indurated mass was palpable in the breast

tissue. The control groups, with 2 exceptions, received at least one course of sulfathiazole or sulfamezathine of between 20 and 30 g. This was begun pre-operatively, and incision was carried out later at the surgeon's discretion. Drainage was maintained for 48 hours. Subsequently, the wounds were dressed or irrigated with eusol. Stilbestrol, 30 to 65 mg. in 3 to 5 days, was given to lactating women.

The method of treatment with penicillin depended on whether or not the infection was still in the acute spreading stage with attendant constitutional disturbance, on whether an abscess had formed and on the amount of pus present. For the acutely inflamed stage, intramuscular injections of 15,000 units 3-hourly were given until localization occurred. The minimum duration of injections was 12 hours, but no patient required them for more than  $3\frac{1}{2}$  days. When fluctuation was detected, aspiration of all pus was carried out every 24 hours, and penicillin solution was injected in amounts up to  $\frac{2}{3}$  of the volume of pus aspirated, providing this did not exceed 10 ml. (When localization is not complete and full retention of the injection can be ensured, intramuscular injections may be replaced by the injection of the full 24-hour dose of 120,000 units into the abscess cavity. When localization is complete, systemic treatment may be discontinued and, for reasons of economy, a solution whose concentration is 500 units per ml. can be used for injections.) When the abscesses contained more than 10 ml. of pus, incision, evacuation, suture, and twice-daily instillations of penicillin solutions following complete expression of pus were carried out. The choice of dose was governed by the same considerations as apply to aspiration, but the systemic dose, as it was given twice daily, could be reduced to 60,000 units. Where sinuses existed or were made, twice-daily expression and instillation by means of a rubber tube or wide-bore blunt-ended needle were performed, the mouth of the sinus being occluded by a collodion dressing in the interval.

*Staph. aureus* was the only organism found at operation in the abscesses with no external communication. In the control group *Staph. aureus* persisted in 18 of 21 abscesses followed up until healing was nearly complete. In the treated group this organism disappeared in 18 out of 20 abscesses before treatment was discontinued. The disappearance of pus from the exudate closely coincided with the disappearance of *Staph. aureus* from the cultures.

In some instances it appeared that pus formation was prevented or at least reduced by the use of sulfonamides. In 3 cases no frank pus was found. No case treated with penicillin at this stage avoided formation of pus. In fact, suppuration seemed speeded up, localized readily and became thicker than in the control series. However, its average duration was less than half that of the controls.

Twenty-two operations were performed on 17 of the 18 controls, a total of 32 incisions being made. There were 4 operations in the penicillin-treated series, and 4 incisions.

There were 5 cases in each series whose initial temperature rose above 101 degrees F. The average duration of pyrexia after penicillin treatment, however, was reduced to half that of the controls.

The average healing time in the penicillin-treated cases was reduced to one-half that of the controls, and only one of all the penicillin-treated cases exceeded the average time for the controls.

The use of stilbestrol was not necessary in the penicillin-treated cases, and the mothers were able to continue suckling throughout treatment. Breast feeding had to be stopped in the majority of the controls who were lactating.

The total number of days in the hospital and of the period of time during which attendance to the out-patient department was necessary was 661 days for the control group and 232 days for the treated series.

## THE NEWBORN

### EPIDEMIC DIARRHEA IN THE NEWBORN; THE RELATION BETWEEN BREAST AND BOTTLE FEEDING AND THE EARLY DEVELOPMENT OF THE PROPER INTESTINAL FLORA

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*Methodist Hospital*

*Am. J. Obst. & Gynec., 53: 285-289, 1947*

The author suggests that a probable cause of epidemic diarrhea of the newborn is faulty metabolism, in turn caused by lack of proper intestinal flora. Beneficial bacteria in the infant's intestines may serve to combat the pathogenic organisms producing this disease.

It has been proved that infants acquire the essential intestinal bacteria at birth and even before, but babies delivered following vaginal antisepsis during labor and at the time of delivery, and those born by cesarean section, have been found to have no bacteria in the intestines, either at birth or soon after. The conditions of their subsequent care, sterile water, boiled formula, immaculate surroundings, and so forth, make for further difficulty in their establishing the proper flora.

Breast feeding is the method of choice for introducing beneficial bacteria into the intestines of these infants. For newborns who cannot be nursed, raw mother's milk and raw certified cow's milk are recommended as richest in beneficial bacteria. The inoculation of the large intestines or the rectum with essential bacteria may also be indicated in certain cases.

An epidemic of 17 cases of neonatal diarrhea is reported. There were 9 deaths and 8 recoveries, a mortality of over 50 per cent. Of the 9 who died, 8 were bottle fed, the ninth breast fed for only 4 days. Of the 8 who recovered, 5 were bottle fed, and 3 were both bottle and breast fed.

In a total of 143 living infants delivered during September, 1945, when most of the cases occurred, 116 were both breast and bottle fed, and 27 were bottle fed, a proportion of 81 per cent and 19 per cent. In the 17 cases of diarrhea, 13 occurred in the group of bottle-fed infants, with 8 deaths; and 4 in the group of breast and bottle fed, with one death.

In this same month there were 33 personal cases. Breast feeding, entirely or partially, was prescribed and carried out in all but 3 cases, and the only infant to contract diarrhea was bottle fed.

During the epidemic, bacteriologic examination of a number of infants' stools was made; streptococcus and staphylococcus or both were found in many instances.



The relationship between breast feeding and immunity or recovery in epidemic diarrhea of the newborn as discovered in the author's experience at the Methodist Hospital, seems to merit further investigation and report.

## SUGGESTED MEASURES FOR PREVENTION OF EPIDEMIC DIARRHEA IN NEWBORN

C. NEWBERGER

*Illinois Department of Public Health*

*Hosp. Management, 63: 38-39, 1947*

At the present time, the regulations of the Division of Maternal and Child Hygiene of the Illinois Department of Public Health are being revised on the basis of accumulated field experience. The common aim and single goal of the rules is assurance of the safety and welfare of mothers and newborn infants. These regulations are cited in the present communication because they are of fundamental importance in the prevention of any reportable disease of the newborn, particularly epidemic diarrhea because of the insidious onset of this disease.

1. *Admission routine.* Patients with known infectious diseases or with a history of contact with diarrhea or other communicable diseases within one week preceding admission, shall not be admitted to the regular maternity division.

2. *Segregation of obstetric division.* The obstetric division shall be physically segregated from all other services in the hospital, and beds designated as "obstetric beds" shall be used only by maternity patients.

3. *Patient rooms and nursery.* There shall be a minimum of 800 cubic feet of air space for each patient, and a minimum of 3 feet between beds. The nursery shall provide a minimum of 250 cubic feet of air space per bassinet and a minimum of 18 inches between bassinets.

4. *Special delivery room.* Patients presenting evidence of infection, or possible infection, shall not be delivered in the room provided for clean cases.

5. *Handwashing facilities.* Provision shall be made for such facilities, equipped with arm knee or foot controls, in the labor and birth room, nurseries and examining rooms.

6. *Isolation of mother.* There shall be immediate isolation of all mothers who were delivered outside the maternity division, who present a history of exposure to infectious diseases on admission, or who have fever or other conditions inimical to the safety of other maternity patients.

7. *Isolation of infants.* There shall be immediate isolation of all infants who were born outside the hospital, whose mothers are isolated, or who have or are suspected of having evidence of infection.

8. *Formula room and preparation.* Formulas shall be prepared in a room isolated from any source of contamination by a nurse who wears cap, mask, and sterile gown, and employs sterile equipment and aseptic technic.

9. *Personnel.* A separate nursing personnel shall be provided for the obstetric division. All attendant staff before assignment to the maternity division shall be examined, excluding an x-ray of the chest, and shall be certified as free from communicable disease. The personnel shall report to the supervisor sore throats, colds, diarrhea, or other signs of abnormal health.

10. *Exclusion of sick personnel.* No one with any acute contagious or infectious disease, or presumably infected wound or lesion, shall be permitted to work in the maternity division, or to handle milk, food and food utensils, until examined by a physician, who shall certify that the person is not a disease carrier. If the administrator suspects that any person has contracted any communicable disease, or has become a carrier of such, he shall immediately notify the local health authority.

11. *Records.* Complete records of the mothers shall be kept, and the temperatures taken 4 times daily. Records of the infants shall include number and character of stools, condition of skin and eyes, reaction to feedings, birth weight and daily weight, and temperature taken twice daily.

12. *Reports.* Each case of communicable disease or suspected communicable disease shall be reported immediately to the local health officer.

13. *Visitors.* These shall be limited to one per day per patient. Children under 16 shall not be admitted as visitors, nor anyone who has an infectious disease, who has recently recovered from such a disease, or who has contacted such a disease. Visitors shall not have contact with the infants at any time and shall not be admitted to the delivery room or nursery. Visitors shall neither sit nor place clothing upon the beds.

Failure of observance of any of these regulations may be the cause of the introduction and spread of any one of the communicable diseases.

## SUBSTITUTION TRANSFUSION: A NEW TREATMENT FOR SEVERE ERYTHROBLASTOSIS FETALIS

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Am. J. Dis. Child., 73: 19-33, 1947

Therapy in erythroblastosis fetalis, even before the recent elucidation of the pathogenesis, was directed at correction of the anemia by repeated transfusions. However, reactions to such transfusions were not uncommon and results in

severe cases were not always gratifying. Recently, refinements in the treatment based on newer knowledge of the pathogenesis have greatly improved the prognosis but the mortality rate in icterus gravis has remained high. These facts led to the concept that it would be worthwhile to remove a large portion of the Rh positive erythrocytes from the infant's circulation before they are destroyed by the maternal antibody. It can be shown mathematically that if the infant's entire blood volume (250 cc.) is removed and replaced with 250 cc. of Rh negative blood concurrently, the resulting blood will contain only 36.7 per cent of the original circulating blood.

The technique used in such a procedure is as follows: Plasma is allowed to run into an exposed superficial arm or leg vein by gravity. Blood is withdrawn from the longitudinal sinus or the brachial artery. After 50-60 cc. has been withdrawn, Rh negative blood replaces the plasma and blood is withdrawn at the same rate as the Rh negative blood is given. When an estimated 80 per cent substitution has taken place (figuring the total blood volume as about one per cent of the body weight) the procedure is discontinued.

The author reports 7 cases treated by substitution transfusions with apparent recovery. Two cases of severe erythroblastosis were treated with exchange transfusions without response to therapy. The author feels that these infants might have recovered if the transfusions could have been instituted within the first 24 hours of life.

Choice of cases for substitution transfusions should be based on a history of erythroblastosis fetalis in previous infants plus all available serological and genetic data. However, attempts to correlate antibody reactions with the severity of the illness have not been entirely successful. Substitution transfusion is recommended chiefly as a prophylactic measure and should be applied during the subicteric period immediately after birth. If toxic manifestations have become pronounced, the benefit of the procedure is minimized.

## THE APPLICATION OF OUR KNOWLEDGE OF THE RH FACTOR

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*Am. J. Obst. & Gynec., 53: 181-189, 1947*

This study includes approximately 5000 Rh determinations. Nearly all of the patients were white (3.8 per cent Negro). Repeated samples of those tested showed 86 per cent to be Rh positive and 14 per cent to be Rh negative.

The incidence of proved hemolytic disease at the author's clinic in the past 3 years has been 1:230 full-term and premature deliveries.

The most interesting finding was that almost all cases of hemolytic disease occurred in infants whose mothers had demonstrable antibodies in their blood. In the past years 55 patients with antibodies present in the blood have been delivered. All but 2 of the 36 cases of hemolytic disease occurred in this group. Thus, by discovering antibodies in the maternal blood, it was possible to place 55 infants under observation for the presence or development of hemolytic disease. This clinic's one experience of effecting immediate delivery in the presence of a rising antibody titer in late pregnancy consisted of a cesarean section performed at the beginning of the thirty-fifth week of pregnancy. The fetus was a typical hydropic infant which immediately expired.

In the past 2 years, 3 major transfusion reactions have occurred. Two of these patients recovered, and their case records are presented in this paper. In one case the patient, whose blood was typed as group O, Rh negative, was inadvertently given 200 cc. of pooled red cells in suspension. The second patient, also Rh negative, was transfused with 250 cc. of mistyped blood which, when rechecked, proved to be Rh positive.

The author has observed and studied 2 patients whose deaths could be directly attributed to transfusion with incompatible Rh blood. The first of these occurred prior to the development of a definite clinical policy. The patient had been sensitized by previous pregnancies. At delivery she was given 800 cc. of supposed compatible blood. Shortly thereafter a reaction occurred. Renal shutdown ensued and the patient expired on the tenth post-transfusion day. She was found to be Rh negative and the donor Rh positive. The second patient's blood was typed as group A, Rh positive. She was admitted to the hospital in the thirty-ninth week of pregnancy because of anemia, and was given 500 cc. of group A, Rh positive, supposedly compatible blood. About 2 hours later she began to develop a reaction. Two days later she had passed a total of 70 cc. of urine. The Rh of the patient was then rechecked and found to be Rh negative. Appropriate therapy was instituted, but after showing marked clinical improvement 15 days post-transfusion the patient expired. The error in typing was due to testing serum of poor specificity employed at that time.

The fetal mortality in hemolytic disease of the newborn at the author's clinic has steadily declined from 85 per cent in 1933-1936 to 42 per cent in 1946. An analysis of the types of hemolytic disease in relation to fetal mortality shows that in 32 cases of hydropic type, the mortality was 100 per cent; in 49 jaundiced, 43 per cent; in 13 anemic, 23 per cent; in 4 hemorrhagic diathesis, 25 per cent; and in 4 unclassified, 100 per cent. Prompt and sufficient transfusions of Rh negative blood, although of aid, are not the complete answer in treating these infants.

The author discusses the results of this study.

ERYTHROBLASTOSIS FETALIS: ACCURATE  
DIAGNOSIS BY NEW TESTS

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Am. J. Dis. Child., 72: 486-488, 1946

These authors discuss the clinical and pathological evidences of erythroblastosis fetalis. Such findings are variable, and new and accurate laboratory tests are now available to supplement clinical and pathological criteria in differentiating erythroblastosis fetalis from other conditions.

Laboratory tests show evidence of: (1) incompatibility between maternal and fetal bloods; (2) active maternal sensitization to fetal antigen; (3) passive transfer of maternal antibodies to the infant; and (4) combination of such antibodies with fetal antigen. Examination of the maternal serum for agglutinins against fetal red cells may show evidence of maternal sensitization. The presence of abnormal agglutinins in the child's serum indicates that passive transfer of maternal antibodies has occurred. A laboratory diagnosis of erythroblastosis fetalis cannot be made from these findings without proof that the maternal and fetal bloods are incompatible. Three methods of showing combination of fetal red cells with maternal agglutinins are as follows: (1) resuspension of the infant's cells in appropriate diluents, such as 20 per cent albumin, will often bring about rapid agglutination; (2) observations of the behavior of fetal cells at oil and water interfaces may be helpful in detecting sensitization; and (3) in certain cases the agglutination of fresh Rh-positive cells by antibodies attached to fetal erythrocytes may be apparent.

Drs. A. A. Weech and Carl H. Smith are discussants on this paper. In reply to Dr. Smith's question as to why some of the most severely affected patients die on the fifth day when there was no evidence of hemolysis on the first day, these possibilities are suggested: (1) that the plasma proteins of the fetus are different from those of the infant after birth and that as they change to more mature form the interaction between maternal antibodies and the baby's Rh-positive cells begins to take place; (2) the mother may pass to the child some protective substances which are deteriorated during the first 5 days of life.

The mere presence of a high titer of anti-A or B agglutinins in the mother's blood against the baby's red cells is no proof that disease is, was or will be present.

In answer to Dr. Weech's question as to which infants can be judged mentally damaged early, the authors expect regularly and have found in every case so far that an infant in whom opisthotonos or spasticity or even convulsions develop within the first week or 10 days will be defective.

THE INCIDENCE OF ERYTHROBLASTOSIS FETALIS  
AMONG FILIPINOS

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Jour. Philippine Med. Assoc., 22: 335, 1946

In a previous study of 182 Filipinos picked at random, the authors found that 177 or 97.3 per cent were Rh positive. The incidence of Rh negative individuals was 2.7 per cent. Since then they have tested a total of 285 persons and found 8 Rh negative bloods or an incidence of 2.5 per cent. This comparative infrequency of Rh negative individuals among Filipinos is the explanation for the few intra-group transfusion reactions and for the relatively few cases of erythroblastosis fetalis in the Islands. This low incidence of Rh negative individuals seems to be an Oriental characteristic since erythroblastosis is also a rare phenomenon among the Chinese.

The authors interest in the subject has been renewed by the recent finding of 4 cases of hemolytic anemia of the fetus and the newborn. Three of these, all representing the hydrops variety, are 0.18 per cent of 1619 deliveries during the period from January 1, 1946 to August 10, 1946. In the Obstetrical Service of the St. Luke's Hospital during the same period, there was a case of hydrops gravis in 511 deliveries or 0.18 per cent. Thus at the North General Hospital, hemolytic anemia of the newborn was found once in every 540 cases. This figure is almost identical to the incidence of one in 511 cases at the St. Luke's Hospital.

These cases of erythroblastosis fetalis found at the North General Hospital and at St. Luke's were all premature deliveries; one in the sixth month and three in the seventh month. All resulted in the delivery of markedly bloated infants with extreme edema and ascites, splenomegaly and hepatomegaly. All died a few minutes after delivery. The placenta was characteristically larger than it should be for this corresponding gestational month and was extremely friable. Histopathology revealed nucleated red cells in the fetal vessels, which seemed few. The stroma was very edematous, and the syncytium was well preserved. The mother's red cells in all four cases were Rh negative. The presence of anti-Rh agglutinins was demonstrated in all but one of these cases by cross matching the mother's serum with known Rh positive bloods of the same type. However, the titre in all was weak.

The incidence of hemolytic anemia of the fetus and newborn in the Philippines is curiously high compared to the rather low incidence of Rh negative Filipinos. Javert in New York gives a figure of one in 438 cases; Burton and McDuff, one in 516; Wolfe and Neigus, one in 568 cases.

## VARICELLA NEONATORUM

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Am. J. Dis. Child., 73: 44-54, 1947

Two cases of congenital varicella are presented. The first patient was born at 8½ months' gestation and developed the exanthema on the ninth day of life. The second patient developed it on the eighth day after birth. Clinically, the disease was not unlike that which appears in older patients. In the first case, jaundice appeared 24 hours before the exanthema, and may have indicated the presence of visceral involvement before the appearance of the cutaneous lesions.

The premature infant died at the age of 12 days, on the third day of its infection with varicella. Autopsy observations indicated widely disseminated visceral lesions in the lungs, liver and gastrointestinal tract, associated with the usual cutaneous changes. These lesions were characterized by multiple areas of focal necrosis and by intranuclear inclusions.

It is doubtful whether immediate removal and isolation of the newborn infant would have prevented the disease, since delivery occurred after the onset of varicella in the mother. It is advisable to administer convalescent serum prophylactically to the baby when it is known or suspected that the mother has recently been exposed or is infected after parturition. The treatment of varicella is directed toward the prevention of secondary dermal and pulmonary infections, maintenance of fluid balance and adequate caloric intake. Breast feedings should be withheld. 6 figures.

CONGENITAL DEAFNESS AND OTHER DEFECTS FOLLOWING  
GERMAN MEASLES IN THE MOTHER

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Am. J. Dis. Child., 72: 377-381, 1946

Stimulated by various reports in the literature which suggest a relation between congenital deafness and other abnormalities in the child and the occurrence of German measles during pregnancy, the author investigated data at the Clarke School for the Deaf. Inquiries were made of mothers when there was any doubt as to the cause of deafness in the child, and to all mothers with only one child if his deafness was the only instance of deafness in the family so far as the author

had been able to determine. One hundred and twenty-nine mothers received letters, of which 116 replied. Of these, 10 had had German measles during pregnancy and 2 had had other virus disease during pregnancy.

The data concerning the 10 children whose mothers had German measles during pregnancy are presented. Five mothers contracted rubella from the beginning of pregnancy to 2 months, and of their offspring, 3 were partially deaf and 2 were profoundly deaf. Three of the children presented congenital eye defects and 4 had congenital cardiac defects. All 5 children exhibited various other defects. Of 5 mothers who had rubella from the second to the sixth month of pregnancy, 2 of the offspring were partially deaf and 3 were profoundly deaf. One child had right internal strabismus. None had congenital cardiac defects. Three showed possible mental retardation, and one had poor muscular coordination and awkward gait.

There is some doubt as to the cause of deafness in 2 of these cases. One child, whose mother had rubella in the second month of pregnancy, and whose defects seem to fit the general picture, had a deaf maternal uncle whose deafness may have been congenital. One child's mother had German measles during the sixth month of pregnancy, at a period regarded by many as too late to permit any profound disturbance by the virus of rubella.

Two mothers had influenza in the first and second months of pregnancy, respectively. Both children were profoundly deaf; one was mentally retarded and the other had fragilitas ossium but no blue sclera.

Six cases are presented in which the mother did not have any virus disease during pregnancy but in which the child exhibited some of the same congenital defects which are supposed to be caused by maternal rubella during pregnancy.

## BIOLOGICAL ASPECT OF THE VAGINAL SECRETION DURING THE GENITAL CRISIS OF THE NEWBORN

M. TORTORA

Arch. di ostet. e ginec. (Italy), 51: 290-302, 1942

Studies were made on the behavior of the pH, bacterial flora and epithelial elements of the vaginal secretion of 30 girls during their first 2 weeks of extra-uterine life. Papanicolaou's technic was used.

During the genital crisis, which usually occurs from 3 to 6 days after birth, the following findings were observed: very high figures of vaginal acidity; the bacterial flora constituted mainly of coccus is changed into one composed chiefly of Doderlein bacilli; decrease of the granulosa and karyopyknotic cells and increase of leucocytes and cells of the spinal layer of the vaginal epithelium.

Genital crisis is due to cessation of activity of the estrogen supplied by the mother, causing desquamation and elimination of the endometrium, cervical and vaginal mucosa. A similar phenomenon takes place, though in lesser degree,



in adults at the end of the proliferative or estrogenic phase of the ovulatory menstrual cycle.

According to the author, the bleeding accompanying the genital crisis is in great part due to degeneration and elimination of the cervical mucosa, with participation of the endometrium in the retrogressive phenomena.

(The chief clinical phenomenon which manifests itself at what the author calls the "genital crisis" is the non-menstrual genital hemorrhage of the newborn, occurring usually on about the 5th or 6th day of life. This is usually scant and of short duration, lasting only a day or two, but in some cases it has been reported as free. It is not surprising that it was in the past interpreted as precocious menstruation. Unlike the latter, it never recurs. Its mechanism is not unlike that seen in an anovulatory cycle, in that the bleeding is due to the sharp withdrawal of the maternal estrogen which occurs at birth. Not only the endometrium of the newborn, but also the uterine musculature, is affected by this hormone withdrawal which takes place at birth. Because of the maternal hormone, the uterus of a baby at birth is considerably larger than it is for many years afterwards, when the child's own estrogens become operative in the prepubertal epoch.

The observations made by the author on the biological reactions in the vagina are about what one would expect, except for his assumption that the cervical regression causes part of the bleeding. This is so at variance with what happens in the estrogen-induced bleeding of later life that it must be looked upon with some doubt.—Ed.)

# OPERATIVE OBSTETRICS

## CESAREAN SECTION

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Canad. M. A. J., 56: 170-177, 1947

The considerations set forth in this paper are based on a series of 158 cesarean sections performed during the 6 years from 1940 to 1945 by the author or by a resident with the author's assistance. In the 6 years that Andison was in charge of the Maternity Hospital of the Preston Royal Infirmary there were 113 sections in 5133 cases, an incidence of 2 per cent. According to Stander, the incidence should not exceed 4 per cent. In the present series of 158 cases there were 3 deaths, a relatively high rate of 1.9 per cent. In a recent study of cesarean section mortality, Dieckmann claimed that in favorable circumstances, and when done by skilled operators, the maximum total mortality rate should be 0.5 to 1 per cent. Aside from the mortality, in considering the performance of cesarean section, it must be taken into account that if a woman has a section for her first pregnancy, the size of her family is likely to be seriously reduced.

In the series presented, 88 per cent were done through the lower uterine segment. The classical section was reserved for patients in whom the lower segment was inaccessible because of a pendulous abdomen, or because of extensive adhesions. The author states that there are still too many classical operations being performed, and can imagine no valid reason for failing to employ the lower segment operation routinely, although it must be admitted that one does encounter trouble more often in the lower segment section. Placenta previa is often conceded as an indication for classical section, but the writer believes that the lower segment operation in such cases has an advantage when there is profuse bleeding from the placental site after delivery of the placenta, in that the bleeding point can be accurately distinguished and hemorrhage checked by appropriately placed sutures. The most important advantage of the lower segment operation is that it permits intervention after the patient has been in labor in doubtful cases, and thus limits the number of sections performed. Of the cases here reported, 67 were elective and operated upon prior to labor, in 65 labor had been in progress for a variable length of time, and in 26 the patients were not in labor, but had had antepartum hemorrhage.

Ether anesthesia was used most frequently in this series; it is far from the best anesthetic but is often the only one available. Ether in cesarean section makes for poor retraction of the uterine muscle following delivery so that there is often much free bleeding. In many respects the ideal mode of anesthesia is novacaine

infiltration. This was used in 40 per cent of the present series. It is the method of choice in cardiac disease, in diabetes and in eclampsia. Local is not a suitable form of anesthesia when any addition intra-abdominal procedure is contemplated, or in very nervous apprehensive patients. However, the author has found that such women behave very well if they understand beforehand the advantages to themselves and their baby from local anesthetic. The writer has had good success with demerol combined with scopolamine, and more recently has employed cyclopropane anesthesia in 18 patients, with good results. However, when using this latter method of anesthesia, only pitocin or preferably ergometrine, as an oxytotoxic agent should be used.

As for indications for cesarean section in this series, a total of 60 were done for disproportion; 34 of these being performed after a trial of labor. In 21 cases of the 158 the operation was performed solely because the patient had already had one, and in 2 instances, 2 cesarean sections. In this latter respect, the author's opinion is that if all other circumstances are favorable, it is reasonably safe to allow a patient who has had a previous lower segment operation to go into labor on a subsequent occasion if the postoperative course has been comparatively afebrile. In the case of a former classical section, if soft tissue radiography revealed that the placenta was on the anterior uterine wall, he would certainly do a repeat section just before term, since implantation of the placenta over the old scar renders it liable to rupture.

Heart disease was the indication for cesarean section in 4 patients. The more one observes patients with pregnancy and heart disease, the less one is inclined to resort to operative delivery. In 7 cases section was performed because of the presence of pelvic tumor (uterine fibroid in 4 instances). The writer believes that such cases should be allowed to go practically to term, and that then cesarean section and removal of the tumor should be combined in one operation. Cesarean section was done for toxemia of pregnancy on 3 occasions, and in only 2 cases of eclampsia. These conditions are best managed more conservatively. In 26 cases placenta previa was the indication for operation. No other method of delivery should be considered in complete placenta previa, and more and more often the author is inclined to select section as the method of delivery in marginal placenta previa.

Uterine inertia is usually best managed by patience and careful attention to details in the conduct of the first stage of labor, but where other factors must be considered as well, section may be a wise procedure. In 10 patients inertia was the indication for section.

In 19 cases cesarean section was performed because of malpresentation of the fetus, but in many of these there was some additional complication which lent weight to the decision to adopt operative delivery.

All of these general indications are subject to individual interpretation and the particular circumstances surrounding a case.

THE TECHNIQUE OF THE LOWER SEGMENT  
CAESAREAN SECTION

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J. Obst. &amp; Gynaec. Brit. Emp., 54: 65-69, 1947

The technique of cesarean section used at this hospital permits, in the author's opinion, overcoming many difficulties caused by insufficient access to the operative field. Other factors can be avoided which may prevent a quick convalescence and the attainment of the best anatomical and functional results.

It has been the custom to perform the operation in the middle of the first stage of labor, if conditions permit. When the cervix admits 4 fingers, the incision can be made in the supravaginal part of the cervix, just above the attachment to the vaginal wall. The passive uterine segment is greatly expanded at this time and the scar after complete uterine involution is very small.

The operation is performed with the patient in the Trendelenburg position, the degree of inclination such as to make the lower abdominal wall horizontal. A second assistant stands between the patient's legs during the operation, giving him good access without interfering with the surgeon or first assistant.

Pfannenstiel's transverse abdominal incision is generally used. This probably diminishes the symptoms of peritoneal reaction after operation. In urgent cases or for obese patients, it is best to employ the longitudinal incision. After opening of the abdominal cavity, 2 abdominal retractors may be introduced which are directed downward and laterally, giving better access to the lower uterine segment than the use of only one broad retractor. Two large swabs wrung out in physiological saline are put between the abdominal wall and uterus to prevent spilling of liquor amnii into the peritoneal cavity. The uterovesical fold of the peritoneum is incised transversely from one round ligament to the other. The connective tissue surrounding the bladder under the peritoneum is dissected up to the uterine wall and later the bladder is detached by blunt dissection to the region of the vagina.

A longitudinal fold of the wall of the lower segment is made by clamping it with 2 Allis's forceps. This fold between the 2 forceps is cut sufficiently to admit an aspirator to drain off the liquor amnii. After the liquid is withdrawn the incision is enlarged transversely about  $2\frac{1}{2}$  inches on each side.

In the case of a vertex presentation the obstetric forceps are applied for extraction of the head. Then the index finger is placed under the axilla, the anterior shoulder and arm are disengaged, and then the other shoulder and arm in the same way. In breech presentation the surgeon first disengages both legs, then the shoulders and arms, and extracts the head by means of a manœuvre very similar to the Mauriceau-Smellie method.

An injection of one cc. of pituitrin is made into the active part of the uterine wall. The placenta is removed by firmly pressing on the uterine fundus and

pulling the cord gently, but not before the uterus is well contracted as a result of the pituitrin injection.

The uterine incision is closed by 2 tiers of continuous catgut sutures. After the swabs are withdrawn, the lower part of the peritoneal cavity, particularly the pouch of Douglas, should be wiped with gauze. When infection is suspected the peritoneum of the vesico-uterine pouch and pouch of Douglas is dusted with sterile sulfanilamide powder, as is the tissue between layers during closure of the uterine incision. 1 figure.

## POSTMORTEM CESAREAN SECTION

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*Am. J. Obst. & Gynec., 53: 343-344, 1947*

Of 330 reported cases of postmortem cesarean section that occurred in the eighteenth century, only 7 living children were recovered. In 1916 Pfaff reported a selected group of 52 well-authenticated cases of which 42.3 per cent were successful. Since that time, scattered cases have appeared in the literature.

The case is presented of a 34 year old gravida iii who was admitted to the hospital at 3:50 A.M., April 28, 1946, having awakened at 2:00 A.M. the same morning with backache in the lower lumbar region. Her prenatal course had been relatively uneventful. The patient presented no complaints on admission, but as she was being assisted into bed in a labor room, she slumped over in a faint. Emergency resuscitative measures and stimulants were administered at once, but when the house physician arrived several minutes later the patient had expired. Fetal heart tones were located, the dead woman was quickly transported to a delivery room, a postmortem cesarean section was performed, and a living 8½-month baby girl weighing 6 lb., 7 oz. was delivered at 3:58 A.M., just 8 minutes after the mother's admission to the hospital. The child, at the writing of this report, was well and normal in all respects.

A postmortem examination was performed on the mother, of which the pathologic summary was: "mild atheroma with consecutive incomplete rupture and resulting dissecting aneurysm which is extensive and terminated in hemopericardium with cardiac arrest."

The cause of death in this case is relatively rare in itself, there being less than 500 cases reported in the literature. Men are affected twice as frequently as women. This patient presented none of the typical clinical evidences of this disease. To the writer's knowledge, no case is on record of a successful postmortem cesarean section with dissecting aneurysm as the cause of death in the mother.

## HEAD FLEXION IN FORCEPS TECHNIQUE

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J. Obst. &amp; Gynaec. Brit. Emp., 54: 34-38, 1947

In this paper the author attempts to illustrate certain aspects of flexion of the fetal head associated with vertex presentation which, although perhaps well known, are not usually described in textbooks, and which comprise knowledge essential to the obstetrician who strives to perfect his technique.

Experimentally, the head of a full-time fetus was fully flexed and fixed against very slight resistance with the occiput anterior. The forceps blades were applied along the occipito-mental diameter and traction begun. When traction-force reached about 40 pounds the head became deflexed and the forceps began to slip from the deflexed head. It was found that by increasing the resistance to extension by narrowing the canal or by merely making pressure over the face, the traction-force necessary to effect it was raised. From these observations, the following facts emerge: (1) the pull exerted on the axis-traction forceps tends to deflex the normally flexed forecoming head; and (2) maintenance of flexion is a function of the maternal resistance in the conditions governing forceps extraction.

The movement of extension is prevented by the resistance of the birth canal and as the traction-force is raised the forces distending the canal are raised more or less proportionately and chiefly because of the tendency to increase of the diameter of engagement. Experience with controlled axis traction suggests that the tendency to extension which is produced by traction-force is, in most cases, easily balanced by the counter-forces of resistance with pulls up to about 50 pounds. As the traction-force is raised above this level the resistance finds it increasingly difficult to prevent extension.

In practice, if the head deviates from full flexion, the ideal application of the forceps blades along the occipito-mental diameter will not promote flexion but will tend to increase deflexion when traction is begun, nor will traction-force itself be directed in the pelvic axis. When the blades are applied to the deflexed head so that the long axis of each blade lies just in front of the tragus, while the tip reaches over the angle of the jaw, there will be traction in the pelvic axis, but there will also tend to be an increase in extension when traction is begun.

In order to obtain and maintain flexion in cases where it is wanting, when uterine contractions are frequent, traction-force may be made to coincide with the contractions, while at the same time fundal pressure may be helpful. Much trouble may be avoided if a rhythmic traction-force is developed up to 50 pounds, coincident with uterine contractions and, when greater force is necessary, by "stepping up" the pull slowly and gradually. 2 figures.

# SODIUM PENTOTHAL ANESTHESIA IN MAJOR OBSTETRIC AND GYNECOLOGIC SURGERY; PRELIMINARY REPORT OF 300 CASES

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Am. J. Obst. & Gynec., 53: 207-213, 1947

Intravenous sodium pentothal anesthesia was used in 300 consecutive major obstetric and gynecologic cases, of which 50 were obstetrical and 250 were gynecological, with successful results. Infusion of a 2 per cent solution, or even 0.5 per cent, was employed for a maintenance dose. This series of cases received routinely a dose of  $7\frac{1}{2}$  grains of veronal or some barbiturate derivative the night before operation. One hour prior to operation a hypodermic injection of  $\frac{1}{6}$  grain of morphine sulfate and  $\frac{1}{160}$  grain of atropine sulfate was given. For cesarean section the atropine was given alone without morphine. In the obstetric cases there were 45 cesarean sections and 5 cases of cesarean section and hysterectomy.

The smallest amount of agent used in the obstetric cases was 0.4 Gm., and the largest was 1.6 Gm. In the gynecologic cases, the smallest amount was 0.5 Gm., and the largest was 2 Gm. The shortest anesthetic time was 20 minutes, and the longest was 120 minutes. No untoward maternal or fetal complications were encountered. The infants did not show asphyxia, but 7 were drowsy and required stimulation. These occurred in cases where the babies were not delivered within 5 minutes after the incision was made. There were no maternal or fetal deaths. No unusual degree of postoperative bleeding was noted. The postoperative sequellae were excellent in the entire series. Postoperative vomiting and distention did not occur. Amnesia of events was marked. Pulmonary, circulatory and metabolic complications and undue morbidity were not encountered. Patients desired food immediately after operation. The blood pressure was maintained and peripheral circulation was good. The majority of patients requested to urinate immediately after awakening.

Laryngeal spasm occurred in a few cases and was treated by adjusting the airway and slowly deepening anesthesia. Tremors were not observed. Coughing and hiccoughs occurred temporarily.

The indications for sodium pentothal anesthesia listed by the authors are: (1) extremely nervous and apprehensive patients; (2) patients fearful of inhalation anesthesia; (3) patients intolerant to pain of local, region or spinal; (4) frail, debilitated patients in whom other methods are contraindicated.

The contraindications are: (1) advanced cardiac disease with dyspnea; (2) toxemia; (3) obstruction of airways.

It is concluded that sodium pentothal intravenous anesthesia is safe for patients, its dangers being minimal in the hands of a competent properly trained anesthetist. In cesarean section precaution should be taken that the baby is delivered within 5 minutes from injection. Sodium pentothal does not give good relaxation for extensive abdominal procedures, but it can be supplemented by other methods. Further researches may overcome this difficulty.

## SOCIAL AND LEGAL ASPECTS THE GENETICS OF EPILEPSY

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Am. J. Psychiat., 103: 457-462, 1947

Any dependable structure of knowledge concerning the genetics of epilepsy must be built on the following data:

1. The incidence of epilepsy in various age groups of the general population.
2. The incidence of seizures among the blood relatives of epileptics with attention to possible genetics and acquired factors.
3. The incidence of seizures in those relatives in which the hereditary factor is known, that is, in monozygotic twins.
4. The incidence of asymptomatic cerebral dysrhythmia in the general population, in epileptics and in the co-twins or other relatives of epileptics.

*Epilepsy in the General Population.* Among the near relatives of 1115 personnel of state hospitals, 0.66 per cent had experienced one or more seizures. Figures from the military draft have the virtue of large numbers but the defects of a selected age group and what is more important, virtual dependence on the draftee's statement for the diagnosis. For want of better data, most writers accept the incidence reported in the United States draft figures for World War I, namely, 0.5 per cent. The screening out of epileptics who were in institutions, the absence of the child population with its high seizure rate, and the failure of many men to know about or to report their seizures are factors which if corrected for would tend to increase the reported incidence. Therefore, 0.5 per cent is probably a conservative estimate of the proportion of the population subject to recurring seizures.

*Incidence among Relatives.* Among 12,119 near relatives of 2130 epileptic patients, 2.7 per cent gave a history of recurrent seizures. This incidence of 2.7 per cent is approximately five times the incidence of epilepsy among draftees in the first world war. Hence, heredity is undoubtedly a factor in the etiology of epilepsy. On the other hand, the above figures indicate that any given child of an average epileptic has about thirty-nine chances out of forty of being normal. The author notes that on the basis of the proportion of persons with a positive family history, the influence of heredity in epilepsy is about the same as in diabetes.

The author then sought statistical evidence of the relative importance of acquired epilepsy by dividing the epileptic group into two categories—those with and those without a history or other evidence of brain injury which antedated the onset of seizures. In the group having such a history there were 2714 relatives of whom 1.4 per cent were epileptics. Among the 10,152 relatives of the patients without history of brain injury, 3.0 per cent were epileptics. Therefore, inheri-



tance as judged by a number of epileptic relatives, is only 40 per cent as great in acquired epilepsy as in genetic epilepsy. The incidence of epilepsy among relatives is three times greater in the acquired group of epileptics than in the general population. Therefore, an essential or genetic influence is present even in the acquired group.

Various conditions may modify the weight of heredity. Thus, epileptic relatives are nearly four times more numerous if epilepsy began in the first five years than if it began after thirty years. Investigating the role of age at onset with respect to sex, the author found that young females have a disproportionately large number of epileptic relatives. Thus, among male patients epileptic relatives are nearly three times more numerous if the patient experiences his first seizure in the first five years than if it occurs after he is 20. But among female patients the epileptic relatives are nearly five times more numerous.

*Incidence among Twins.* Previous evidence by various authors has shown the frequency of epilepsy in both co-twins if they are identical and its rarity in both if they are fraternal. The author has studied 55 twins effected by seizures. The percentage of twin pairs in which both co-twins were epileptic was 94 per cent in the monozygotic group without evidence of brain pathology, and only 17 per cent in the monozygotic group in which the epileptic co-twin had evidence of brain pathology. Only one of the dizygotic twins had epilepsy in both co-twins.

*The Brain Wave Test for Carriers.* Paroxysmal "seizure discharges" (high voltage wave either abnormally slow or fast) are especially significant of epilepsy. In the group of 470 near relatives some degree of abnormality was observed in 50 per cent against 16 per cent in an adult normal control group. Rhythms which were mildly slow or fast were 2.6 times more frequent in relatives than in controls; very slow or fast rhythms were 6 times; and seizure discharges 8 times more frequent. In the group of identical twins in which one of the co-twins had epilepsy and cortical dysrhythmia, the brain wave record of the normal co-twin is almost always abnormal also.

## MISCELLANEOUS

### AN ANALYSIS OF THE SEX RATIOS AMONG SINGLE AND PLURAL BIRTHS IN THE TOTAL, THE "WHITE" AND THE "COLORED" UNITED STATES POPULATIONS

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Am. J. Phys. Anthropol., 4: 491-501, 1946

The sex ratios among single, twin, triplet and quadruplet births, within the total, the "white" and the "colored" U. S. populations from 1922 to 1936 inclusive, are presented. The sex ratio in most instances deviates significantly from a 50:50 ratio. Most of them do so in favor of males, but a few do so in favor of females.

It is found that the observed variance of the 15 yearly percentages of males of some of the populations is greater than the variance expected due to chance. This is particularly true for the percentages of males among stillbirths. The conclusion is drawn that this excess observed variance probably is due primarily to variations in environmental factors.

The authors show conclusively that the percentage of male births among all births decreases significantly in the human species with each increase in number of embryos per pregnancy. Two hypotheses are suggested. One is that the male embryos tend to be eliminated to a greater extent than female embryos with increased competition. The other suggested hypothesis is that female determined zygotes tend to twin, triple or quadruple to a greater extent than do male determined zygotes. The first hypothesis is favored.

It is found that the percentage of males among live births and stillbirths combined, is significantly lower among single, twin and triplet births within the "colored" population than among the corresponding births of the "white" population. These racial differences are probably due primarily to racial genetic factors but probably also to racial environmental factors. That the percentage of males among "colored" single stillbirths is significantly larger than that among "white" single stillbirths is probably due largely to racial environmental differences.

## SEROLOGY AND OBSTETRICS

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Am. J. Obst. & Gynec., 53: 459-466, 1947

It is understood that the possible death of the recipient of incompatible blood is due to the agglutination of the donor's cells by the action of the agglutinins of

the blood of the recipient. It is not generally sensed that such incompatible blood may be actually poisonous to the cells of the recipient, and that, if the obscuring effects of agglutination and hemolysis could be obviated, there would be noted pathology in the recipient similar in kind to that found in toxemia of pregnancy. This is illustrated, occasionally, in cases of delayed transfusion deaths, and even in disease manifestations following the intramuscular injection of, here defined, toxic bloods.

From the disease standpoint, one is not dealing basically with agglutinogens and agglutinins, but with toxic substances and antitoxic substances. This concept of fetal toxins and maternal antitoxins provides a reasonable explanation of why the group O mother inherits the anti-A and anti-B agglutinins; the group A mother, the anti-B agglutinin; and the group B mother, the anti-A agglutinin.

In 1923, McQuarrie published his article in corroboration of the theory that incompatibility of blood might be the cause of pregnancy toxemia. The more recent work on the Rh factor seemed to complete the whole circle of the classical and largely accepted toxin antitoxin mechanism, enunciated by Ehrlich. In these cases of clinical erythroblastosis the correlation of an accompanying toxemia is about 30 per cent, which is significant, as it is far above the average incidence of toxemia in general from whatever cause. This would seem to indicate that the Rh substance is a toxin when it can gain access to a host not possessing a similar substance by heredity.

It soon became evident that the A and B substances could bring about the same train of events when the Rh status of mother and fetus was similar, thus placing these substances under the definitions of toxins.

Three cases are presented to illustrate the arguments involved. The mothers were in group O, the husbands in group A, the children in group A, and mothers, husbands and children were Rh positive. In the first case the mother developed a low grade toxemia and her anti-A agglutinin titer rose to around 1/1000. Minor premature separation occurred, but she delivered normally at term a clinically and serologically normal child. Five days post partum the mother's anti-A agglutinin titer rose to around 1/2000, and she slowly recovered.

In the second case, a primigravida developed a toxemia accompanied by an anti-A agglutinin titer around 1/1000. The child died in utero at about the 28th week, and was delivered. Five days post partum the mother's anti-A agglutinin titer rose to 1/100,000, with rapid disappearance of toxic manifestations.

The third patient, a multigravida, gave a history of 2 previous erythroblastotic disasters. Her anti-A agglutinin titer rose to around 1/8000; no signs of toxemia were noted. The mother was delivered by cesarean section, at the estimated time of viability of the fetus, of an erythroblastotic child which was saved by multiple transfusions. Five days post partum the maternal anti-A agglutinin titer shot up to 1/8,000,000, and she recovered uneventfully. The author discusses these 3 cases.

The importance of genetic testing of blood, along with the Wassermann tests, on husband and wife, is stressed.

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# Maternal Mortality Reports

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*(Secretaries of Maternal Mortality Committees are invited to submit selected cases of maternal deaths, with analyses appended, for publication in this section of the Survey. Cases should be chosen on the basis of educational value, not because of rarity. For obvious reasons complete anonymity will be maintained.)*

*Readers should note that the comment which follows each case history represents the opinion of the Committee concerned and does not necessarily reflect the attitude of the Editors.)*

## CASE NO. 42

The patient was a 28 year old white multipara who was admitted to the hospital at 4:15 A.M. on September 21 in deep shock and bleeding profusely from the vagina. The family and past history were noncontributory. The patient's previous pregnancies were normal and terminated at term without complications. All previous puerperia were normal. The last menstrual period was in December and the estimated date of confinement some time in September. The present pregnancy was essentially normal insofar as the history could be obtained from the family, until 11:30 P.M. on September 20 at which time the patient awakened from sleep feeling nauseated. Shortly thereafter she vomited and began to bleed from the vagina. The blood was bright red without clots and it was estimated by the family that she bled approximately 1 pint at this time.

The midwife who was supposed to attend her was called and according to the report she did a rectal examination on the patient. It was her impression that the patient had ruptured her membranes and she stated that labor would probably begin soon. The bleeding ceased for a time but at half-hour intervals the patient had episodes of nausea and vomiting at which time she bled moderately severely. These episodes continued for approximately two hours. The midwife then called the physician who had seen the patient during her prenatal period. Upon his arrival at the patient's home he advised immediate hospitalization. This was approximately at 2 A.M. on September 21. While being transferred to the ambulance the patient again had a severe episode of bleeding which was followed by a continuous slight flow. At 4:15 A.M. she was admitted to the hospital in an unconscious state, her pulse rate being 140 and her respirations 44 per minute. The blood pressure at this time was 50/0 and the patient was immediately given 500 cc of blood plasma intravenously and  $\frac{1}{4}$  gr. of morphine sulphate. Oxygen per mask was started and then the patient was typed and crossmatched. At 4:30 A.M. 500 cc of citrated blood was started and at this time the blood pressure and pulse were unobtainable and the respirations were shallow and rapid. At 5:00 A.M. the blood pressure was 64/38 and the pulse was counted at 144 per minute. At this time the patient began to react, became nauseated and while vomiting expelled a large clot from the vagina and immediately began to bleed again profusely.

The patient was taken to the operating room after it was decided that an immediate cesarean section was the procedure of choice. She was in such deep shock that no anesthetic was administered, oxygen being given continuously by mask. A classical incision was made in the uterus and a full-term dead child weighing 6 lbs. 7 oz. was delivered. The placenta was found lying over the internal os and following its manual removal the uterus contracted well. Oxytocics were given and the uterus and the peritoneal cavity were closed in the routine manner.

The patient was in profound shock at this time, neither the blood pressure nor the pulse being obtainable. During the operation she received 2000 cc of citrated blood and im-

mediately following it 1000 cc of blood plasma. She began to react about 7:00 A.M. at which time the blood pressure was 60/38. The uterus contracted well at the time of delivery and remained the same. Penicillin was started prophylactically and another transfusion of 500 cc of citrated blood was given at 2:00 P.M. At this time the pulse rate was 184 and the blood pressure 100/76. Along toward evening the patient became restless, did not respond to stimuli and her blood pressure began to fall. Her temperature rose to 103°F. and more whole blood was given. In spite of ephedrine, adrenal cortex and oxygen the radial pulse remained impalpable. The patient had a slight convulsion at 8:00 A.M. and another at 10:00 A.M. The lung fields became moist, respirations remained very shallow and a slight amount of rusty frothy fluid began to drain from the mouth. At 10:05 A.M. respirations ceased. No autopsy was obtained.

*Discussion:* The determining factor in this death from placenta previa was in all probability the rectal examination carried out by the midwife. It is now well established that patients with placenta previa rarely bleed to the point of shock and unconsciousness unless an examination has loosened additional placenta and traumatized the bleeding area. In other words, it seems likely that the repeated episodes of hemorrhage which the patient suffered following the rectal examination would not have occurred had she been sent to the hospital without examination immediately after the initial bleeding. In the opinion of the Committee, therefore, the case is a midwife death and recalls to mind the fact that such midwives are a menace to childbearing women. The midwife is to be incriminated not only for performing the rectal examination but also for the long delay in summoning the help of a physician. There was, furthermore, a long delay between the visit of the physician and the patient's arrival at the hospital, namely, 2 hours and 15 minutes, and it is quite conceivable that had this trip been expedited, prompt blood transfusion at the hospital might still have saved the patient. In sum, this case was clearly a preventable death due chiefly to the rectal examination performed in the presence of evident placenta previa abetted by the long delay in placing this patient under hospital care.

#### CASE NO. 43

The patient was a 39 year old white primigravida with known rheumatic heart disease who had been under the care of her family physician for her heart condition and under the observation of the physician to whom she had been referred for her obstetrical care. She was admitted to the hospital on October 19 when she was approximately 34 weeks pregnant with a diagnosis of rheumatic heart disease complicated by hypertension and albuminuria of several days' duration. The urine on admission showed 1 plus albumin and was negative microscopically. The blood urea was 33 mg.% and the sugar was 97 mg.%. The examination of the eye grounds on October 23 showed no abnormalities. According to the hospital history the blood pressure reading on October 24 was 195/100 and one urine examination on that day was recorded as negative for albumin, but a second urine examination on the same date was reported as albumin 2 plus. On October 24 the patient was placed on digifolin. On the day following consultation it was decided to deliver the patient by cesarean section. Accordingly, on October 25 a premature living child weighing 4 lbs. 15½ oz. was delivered through the abdominal route.

The patient withstood the operation well and was given 500 cc of whole blood as a precautionary measure prior to being returned to her room. Forty-eight hours postoperatively she showed some distention which was relieved by a high rectal tube and Wangenstein drainage. Approximately five hours after the distention had appeared the patient

suddenly developed an acute cardiac collapse. Despite heroic measures she failed to respond and expired at 8:05 A.M. on October 28. No postmortem examination was permitted.

*Discussion:* This was an avowedly difficult case and it is quite conceivable that the patient might have died under any type of care, but after much discussion the Committee reached the conclusion that the patient's outlook for recovery would probably have been better had the management of the case been more conservative. The very high blood pressure in this 39 year old primigravida was itself of serious import, but when such hypertension is superimposed on a diseased heart the likelihood of cardiac failure makes for an even graver situation. Moreover, the physician who confronts such a case cannot help feeling that the hypertension might well be alleviated and the burden on the heart diminished if pregnancy were terminated; and the validity of this contention cannot be denied. On the other hand, it is well known that both hypertensives and patients with rheumatic heart disease are poor operative risks and, as was true in this case, the trauma of abdominal intervention may more than offset any advantages to be obtained. In the presence of rheumatic heart disease distension may play havoc with cardiac function as this case so well exemplifies; and this of course is another objection to cesarean section in such a patient. As indicated above, the Committee was divided as to whether this death should be called preventable or not, but it was the consensus that further rest in bed and further digitalization might possibly have brought the patient into better condition to withstand the abdominal delivery. Although the time relationships do not indicate that the blood transfusion had any bearing on the outcome, it was considered bad judgment to give this patient with rheumatic heart disease and hypertension a 500 cc. blood transfusion simply as a prophylactic measure.

#### CASE NO. 44

The patient was a 20 year old white multipara who was admitted to the hospital on November 2 in labor. Her family history was noncontributory. Her past history revealed that a right oophorectomy and appendectomy were done at the age of 12 years. Her last menstrual period was in March and the estimated date of confinement was in December. There was one previous pregnancy which terminated at term two years previously and one three months miscarriage which terminated uneventfully about a year prior to this admission. The patient first visited her family physician when she was between two and three months pregnant at which time she weighed 110 lbs., the blood pressure was 120/80 and the urine was negative. The serologic test for syphilis was negative. External pelvic measurements were reported as normal.

She was again seen on July 7 and at this time the blood pressure was 115/75 and the weight 119½ pounds. The urine was negative. On August 6 the blood pressure was 110/75, the weight 128½ pounds and the urine negative. On September 13 the blood pressure was 130/80, the weight 138½ pounds and the urine negative. At this time the patient was advised to delete carbohydrates from her diet. At the next visit on October 8 the blood pressure was 140/80, the weight 144 pounds and the urine showed a 1 plus albumin but it was negative microscopically. She was advised to secure an increased amount of rest and was put on a salt free, low protein diet. On October 15 the blood pressure was 135/80, the weight 143 pounds and the urine showed a 1 plus albumin. On October 27 the blood pressure was 150/95, the weight 144 pounds and the urine showed a 2 plus albumin and a

few red and white cells. The patient was advised to secure complete bed rest and was given a  $1\frac{1}{2}$  gr. of phenobarbital every four hours.

On admission to the hospital on November 2 at 8:30 P.M. the blood pressure was found to be 170/120. The pains were very strong, the presentation L. O. A. and the fetal heart was heard in the left lower quadrant. The cervix was thin and was 1 cm. dilated with the presenting part lying above the spines. The physician in charge of the case was out of town and the general practitioner who was to take over his work had no privileges at this particular hospital. The patient immediately was treated by the house staff without authority and no attempt was made by the physician in charge of the maternity service to secure the aid of an obstetrician who had privileges in the hospital to handle the patient.

She was given 3 gr. of nembutal at 10:00 P.M. at which time the cervix was 3 cm. dilated and the blood pressure 185/140. At 10:15 P.M. the membranes were ruptured artificially by the house physician and at this time the cervix was found to be 8 cm. dilated. The patient was taken to the delivery room and at 10:30 she delivered of a premature living child weighing 5 lbs.  $7\frac{1}{2}$  oz. She was given ergotrate and pitocin following which the uterus contracted well. A first degree laceration was sustained which was repaired.

Fifteen minutes following delivery the blood pressure was 200/140. Morphine gr.  $\frac{1}{4}$  was given thirty-five minutes after this. Blood pressure reading at this time was 230/140. In addition 250 cc. of 25% glucose and 4 cc. 50% magnesium sulphate were given intravenously. At 12:30 A.M. on November 3 the blood pressure was 200/130 and the patient complained of pressure and discomfort in the chest region. The blood pressure remained markedly elevated and at 3:00 A.M. the patient vomited about 300 cc. of greenish fluid. The glucose and magnesium sulphate were repeated and at 4:00 A.M. a catheterized specimen of urine showed the urine to be very concentrated and containing a large quantity of albumin. At 5:45 A.M. the patient had a convulsion. Following this convulsion the obstetrician in chief of the hospital was notified for the first time concerning this patient. He immediately advised paraldehyde by rectum and oxygen inhalations. Between this time and 9:30 A.M. the patient's condition grew gradually worse until she was in a state of collapse with the blood pressure and pulse unobtainable. Plasma and repeated digitalization were ordered and for a time she seemed to be somewhat improved even though she remained in a most critical condition. In spite of great quantities of glucose, sedation and cardiac and respiratory stimulants the patient died at 4:40 P.M. Postmortem examination revealed gross and microscopic findings substantiating a diagnosis of eclampsia.

*Discussion:* This patient gained approximately 10 pounds a month between July 7 and September 13 and showed a further increment of 6 pounds in the next three weeks. Long before October 8, when the total weight gain in three months had reached 25 pounds, the blood pressure 140/80 and the urinary albumin 1+, hospitalization should have been instituted or at least more drastic steps taken to reduce weight gain. Had this been done it is quite probable that the final development of eclampsia would have been forestalled. Even if the toxemia had proceeded to develop despite curtailment in weight gain, hospitalization in October with careful evaluation of the whole picture might have led to induction of labor and so spared the patient the fatal eclamptic seizure.

The physician in charge of this case is of course heavily culpable for leaving the city without making adequate arrangements for this patient; and it was probably attributable to this lapse that the sedation given her in labor was inadequate. Certainly with a blood pressure of 230/140 some 50 minutes after delivery, she required much more heroic measures than were given. She should have received a potent sedative, possibly 30 cc. of paraldehyde per rectum. Since over 7 hours elapsed between delivery and the development of the convulsion, there was ample

time to sedate this patient heavily and keep her sedated. Had this been done the convulsion (possibly associated with a brain hemorrhage in this case) might well have been prevented. On several scores, therefore, this was considered a clearly preventable death.

## CASE NO. 45

The patient was a 26 year old white primipara who was admitted to the hospital on June 26 at 1:15 A.M. in active labor. Her pulse on admission to the hospital was 80. The family history and past history were noncontributory and the serologic test for syphilis was negative. Her last menstrual period was on September 25 and the estimated date of confinement July 2. Labor progressed rapidly and at 4:00 A.M. she was fully dilated and the membranes were artificially ruptured at 4:55 A.M. After episiotomy the patient delivered spontaneously of a living female child. The placenta was expressed at 5:22 A.M. but at this time the patient was bleeding freely. She was given ergotrate and pitocin intramuscularly and at 5:35 A.M. an ampule of ergotrate was given intravenously. The uterus during this time was vigorously massaged through the abdominal wall. At 5:45 A.M. the patient's pulse rate was 132 per minute and she was returned to her room. At 6:00 A.M. with the pulse rate 128 per minute another ampule of pituitrin was given. The patient was pale, her lips somewhat cyanotic. The uterus was firm but she was still bleeding slightly. At 7:40 A.M. she was given  $\frac{1}{2}$  gr. of morphine and an ampule of gynergen. At 8:00 A.M. she was taken to the delivery room and 5% glucose was started intravenously. At this time she was bleeding profusely. The uterus became firm upon massage but she continued to bleed. Oxygen was administered and at 9:00 A.M. it was decided to pack the uterus. This was done followed by more oxytocics, stimulants, plasma, and finally the administration of whole blood was begun. The patient, however, was pronounced dead at 10:30 A.M. No autopsy was obtained.

*Discussion:* This case is an instructive example of the fact that postpartum hemorrhage may not present at first a particularly dramatic picture with the unfortunate result that the physician does not become concerned and nothing is done—until it is too late. Had blood loss been measured in this case, even in the crudest possible way, the attendant would probably have been surprised at its magnitude and the patient given prompt, better and more constant treatment. He would then have paid more attention to a pulse rate of 132 per minute 23 minutes after delivery and would have kept the patient on the delivery table rather than sending her to her room. In other words, the time for action here, including packing the uterus, blood transfusion, etc., was within this hour or so after delivery rather than three or four hours later when she was exsanguinated beyond all hope. This death from postpartum hemorrhage was obviously preventable on the grounds that the patient was neglected over the hours when treatment would have been most efficacious; and when finally intensive therapy was instituted it was too late. An almost exact replica of this history will be found in most fatalities from postpartum hemorrhage.

## CASE NO. 46

The patient was a 32 year old white multipara who was seen for the first time on February 1. No essential facts in the family or personal history could be obtained other than that the first pregnancy was terminated by a classical cesarean section after she had been in labor nine hours, following which the membranes were artificially ruptured, plus an additional seven more hours of labor before the operation was performed. Three days



postoperatively she began to run a rather high temperature which lasted for about eight days and she remained in the hospital for twenty-one days. A diagnosis of acute peritonitis was made but she was finally discharged from the hospital in fairly good condition. The estimated date of confinement of the present pregnancy was August 4. On the first prenatal visit the heart and lungs were negative. She was about twelve weeks pregnant and the pelvic measurements were within normal limits. The patient this time weighed 140 lbs. and the blood pressure was 150/100. She was seen about eight times during her pregnancy during which she gained about eighteen lbs. The blood pressure readings were occasionally elevated but at no time was there any albumin present in the urine. The patient was put on a salt free diet.

In view of the patient's past history of a previous cesarean section followed by a peritoneal infection the attendant felt that an elective section prior to the onset of labor was the procedure of choice in this particular case. Accordingly on July 23 the patient was admitted to the hospital and on the following day under gas, oxygen and ether anesthetic a classical section was done and a 7 lb. 13½ oz. living child was delivered. There was no evidence of any adhesions in the abdominal cavity but there was quite a bit of bleeding from the uterine incision during which time the suction apparatus was out of order necessitating delay in closure of the uterus. It was estimated that the patient lost about 1500 cc. of blood at this time. The placenta was delivered intact after the injection of an ampule of ergotrate directly into the uterine wall. An ampule of pitocin was given intramuscularly. The uterine incision was closed and bleeding seemed to be under control. Tubal sterilization was then performed by the Pomeroy technique. Before closing the abdominal cavity careful examination revealed at the upper end of the peritoneal incision that several loops of small gut were adherent to the parietal peritoneum. An attempt was made to dissect one of these intestinal loops free and in so doing a small tear was made which was immediately closed with silk purse-string sutures and all attempts at further freeing of the adherent intestine were abandoned. The abdominal closure was then begun and at about this time the anesthetist notified the operator that the patient's pulse had risen to 140 per minute and recommended that she receive some glucose in spite of the operator's insistence that blood plasma would be more advisable. The patient was returned to her room about 10:35 A.M. in fair condition. She gradually went into an increased state of shock in spite of administration of glucose and morphine and at this time an attempt was made to give her some blood plasma but difficulty was encountered because of the collapsed veins. An open venesection was done and blood plasma was given at 1:15 P.M. Following this 500 cc. of citrated blood and more plasma and glucose were given through the cannula. The patient gained consciousness and her color improved somewhat but about 4:30 P.M. she seemed again to take a turn for the worse and from this time on her condition was most critical. Abdominal distention developed and a small amount of blood started to ooze from her abdominal dressings. She also began to bleed abnormally through the vagina. There was no dullness in the flanks, the entire abdomen being tympanitic. Oxygen, adrenal cortex and other medication was given. Further consultation was obtained and it was felt that the patient had already received sufficient fluids and that there was considerable likelihood that there was some interabdominal bleeding in spite of the absence of dullness in the flanks. The patient rapidly grew worse and respirations ceased at 1:30 A.M. No autopsy was obtained.

*Discussion:* There are certain hints in this case history suggesting lack of skill on the part of the operator and poor team work by the operating room group. Thus, the hole torn in the intestine in the course of dissecting it free from the anterior abdominal wall, scarcely indicates a deft hand. Moreover, the massive hemorrhage which interfered with proper exposure (blamed on the suction apparatus) suggests lack of experience with the exigencies of cesarean section. Al-

though the patient died too soon after operation to be the victim of the intestinal perforation, and although the 1500 cc. blood loss could have been replaced had immediate transfusion been given, the persistent bleeding several hours after the operation suggests that the closure of the uterine wound left something to be desired. However this may be, the critical error in this case was failure to give immediate blood transfusion following the huge blood loss and it was on this ground chiefly that the death was considered preventable. The Committee also took occasion to note that ether anesthesia in cesarean section is a common cause of excessive bleeding.

## CORRESPONDENCE

The following letter has been received from Dr. J. P. Greenhill in regard to the editorial note on bimanual compression of the uterus which appeared in the April issue of the *Survey*, pages 191-193.

Dear Doctor Eastman:

Concerning your remarks in the Obstetrical and Gynecological Survey about figure 639 of my book, may I say the following. First, I welcome all criticisms and suggestions and I want to thank you profusely for writing me about your criticisms.

You make the following statement: "Speaking of postpartum hemorrhage, it has always seemed to me a curious lapse that one of the most efficacious means of treating this complication and the standard method employed in Great Britain is scarcely known in this country. It is not even mentioned with one exception in any of our textbooks and in the case of that exception it is improperly portrayed."

May I say that you will find an illustration almost identical with yours in another American textbook, namely, Bland and Montgomery's *Obstetrics*, Third Edition, 1939, page 392, figure 592. On the other hand, you will find figure 639 of the DeLee-Greenhill book in the *American Textbook of Obstetrics*, 1895, page 605, figure 394. Likewise, in "The Science and Art of Midwifery" by William T. Lusk, 1899, page 586, figure 224, is an illustration of "Bimanual Compression of the Uterus." (Breisky.)

Hence, there are at least three more American textbooks, two of course, considerably out of date, which describe and illustrate bimanual compression of the uterus in one form or another.

Now for the other side of the picture. By no means do all British textbooks describe and illustrate what you consider the proper procedure. For example, in "The Combined Textbook of Obstetrics and Gynaecology," revised by Munro Kerr, Johnstone, etc., 1944, Fourth Edition, page 562, figure 230, under bimanual compression of the uterus, is the following statement. "A hand is placed in the vagina and grasps the cervix, while the other or external hand compresses the fundus on the cervix, the uterus being firmly compressed between the two hands."

Strange as it may seem I have found that grasping the cervix with one hand and making compression with the other hand outside, does produce contractions of the uterus. Apparently Hamilton of Scotland also found this procedure useful or he would not have stuck to it for many years.

In my opinion it does not matter whether the inside hand holds the cervix or compresses the anterior uterine wall. I believe the important thing is to compress the uterus with the hand outside and to make counterpressure with the hand in the vagina regardless of whether the hand in the vagina is in front of the depressed portion of the corpus, behind this part or under it.

In view of your remarks, however, I may incorporate two illustrations of manual compression in the next edition of the DeLee-Greenhill book.

With kind regards and best wishes, I am

Most sincerely,  
(Signed) J. P. GREENHILL

Chicago, Illinois  
May 21, 1947

(I am deeply indebted to Dr. Greenhill for calling attention to the fact that bimanual compression of the uterus is described in one other modern American textbook, namely, Bland and Montgomery's excellent work, as well as in two nineteenth century volumes. I regret that my statement was too sweeping in this regard but the fact remains that bimanual compression of the uterus receives no mention in most of our standard texts and is infrequently employed in the United States in the management of postpartum hemorrhage.

In view of Dr. Greenhill's experience with Hamilton's first method of bimanual compression, as well as the statement in Munro Kerr and Johnstone, it is apparently necessary to acknowledge that there are two recognized techniques of carrying this procedure out; one in which the vaginal hand grasps the cervix, the other in which the clenched fist is applied to the anterior surface of the uterus. Nevertheless it is difficult to understand how grasping the cervix can produce uterine retraction and it would be my guess that any results achieved by this method are due to the fact that the vaginal hand still opposes the abdominal hand, thereby exerting pressure and massage on the anterior uterine surface.

However all this may be, it is good to know that Dr. Greenhill endorses bimanual compression of the uterus and it is to be hoped that his letter together with the editorial note in the April issue of the Survey will bring about a wider spread use of this valuable procedure than it has hitherto enjoyed.—Ed.)

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# Gynecology

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## ENDOCRINOLOGY

### THE COMPARATIVE FIBROMATOGENIC ACTION OF THE OVARIAN AND URINARY ESTROGENIC HORMONES

R. F. MELLO

*Faculdade de Medicina, Sao Paulo*

Rev. Brasil. Biol., 5: 1-31, 1945

Small pellets of ovarian estrogens, estradiol and estrone, and large tablets of specific urinary estrogens, estriol, equilenin and the isomers alfa- and beta-dihydroequilenin, were implanted subcutaneously in 91 castrated guinea pigs. Necropsies were performed 90 days after implantation. The experiments were made in such a way that the absorption of urinary estrogens was much greater than that of ovarian estrogens. Thus, the author obtained a total daily average of 97 micrograms (equilenin) to 136 micrograms (beta-dihydroequilenin) for the urinary estrogens and from 12 (estrone) to 19 (estradiol) micrograms for the ovarian estrogens.

Comparative observations were made on both tumorigenesis and hystero-trophic action. The problem of parallelism between estrogenic activity and tumoral action was touched. In the calculation of tumorigenesis, a new system of volumetric notes was introduced in addition to the original system of tumoral notes.

All the estrogens produced tumors. According to the system of evaluation, the fibromatogenic action of the large quantities of urinary estrogens was equivalent to, and in other cases even larger, than that produced by the small quantities of ovarian estrogens, excepting beta-dihydroequilenin, which showed a minimum grade of tumorigenesis.

Therefore, it is evident that by means of increased absorption, an equal or even higher fibromatogenic action of the urinary estrogens than of the ovarian estrogens may be obtained, since the quantity of estrogen absorbed reflects on its tumoral action, in spite of the great difference in estrogenic activity between the urinary estrogens and the ovarian estrogens.

This fact acquires added importance as a result of the concept of Lipschütz that the organism, in transforming ortho- and para-hormones (estradiol and estrone) into meta-hormones (estriol, equilenin and dihydroequilenin) not only endeavors to obtain less active substances in the estrogenic sense, but also less

toxic substances which may be easier to eliminate. This transformation would thus represent a means of self-protection for the organism.

In spite of the fact that the isomer beta is less tumorigenic than the isomer alfa-dihydroequilenin, it showed accentuated hysterotrophic action. In this way, by means of appropriate dosages, the hysterotrophic action of estrogen may be dissociated from its tumorigenic action. Thus, certain therapeutic possibilities of self-evident utility become apparent. 18 figures.

(This is an interesting quantitative study of various estrogenic derivatives as regards their fibromatogenic effects upon guinea-pigs. It is especially in this species that estrogens produce the remarkable tumorigenic effects which have been so extensively studied in the laboratory of Lipschütz at Santiago, Chile, and they constitute a fine example of species differences to endocrine agents. As a corollary, they emphasize the hazard of applying the results of endocrine studies upon the lower animals to the elucidation or treatment of human problems, an error which has been responsible for much of our organotherapeutic floundering in the past. The especial contribution of the author's paper is that it indicates the possibility of disassociating the tumorigenic and the hysterotrophic effects of estrogen administration. The author suggests that certain therapeutic possibilities are self-evident, but they are not so self-evident that I feel qualified to indicate them.—Ed.)

## THE COMPARATIVE DURATION OF ESTRUS INDUCED BY OVARIAN AND URINARY ESTROGENS

R. F. MELLO

*Faculdade de Medicina, Sao Paulo, Brasil*

AND

C. FRANKE

*Departamento de Medicina Experimental, Servicio Nacional de Sandidad,  
Santiago, Chile*

Rev. Brasil. Biol., 4: 333-338, 1944

In order to determine the duration of the estrus induced by similar quantities of different ovarian and urinary estrogens, 150 experiments were made with female spayed rats. The estrus induced by estrone was considerably shorter than that produced by free alpha-estradiol. The urinary estrogens, estriol, equilenin, the two isomers alpha- and beta-dihydroequilenin, all induced an estrus of only short duration.

The results of these experiments are discussed with special reference to the comparative rate of absorption and to the comparative estrogenic threshold of the different estrogens used. 1 figure.

ENDOCRINE ALLERGY; CLINICAL REACTIONS OF ALLERGY  
TO ENDOGENOUS HORMONES AND THEIR TREATMENT

B. ZONDEK AND Y. M. BROMBERG

*Jerusalem, Palestine**Rothschild Hadassah University Hospital and Hebrew University*

J. Obst. &amp; Gynaec. Brit. Emp., 54: 1-19, 1947

The authors point out that though it is surprising to find hypersensitivity to endogenous secretions, the existence of endocrine allergy has been established in certain individuals. Allergic hypersensitivity to the steroid hormones (estradiol, progesterone, testosterone and corticosterone) or to the products of their metabolism which are excreted in the urine can be demonstrated in certain pathological conditions generally related to menstruation or the menopause by means of active cutaneous tests.

Of 216 women studied, a positive cutaneous test to a hormonal allergen was found in 73 cases in patients with complaints related to menstruation or the menopause. Only 2 cases with complaints not related to menstruation or the menopause showed positive skin reactions. A positive response to hormones was never observed in healthy women.

The following hormones and their metabolites of the genital and adrenal glands were tested: estradiol, estrone, progesterone, pregnandiol, testosterone, androstosterone and desoxycorticosterone acetate. Solutions of the steroids were prepared in oil in concentrations of 0.1 mg. per 0.1 ml. of pure olive oil. The testing material was injected below the epidermis in a layer somewhat deeper than that employed in using aqueous solutions. Results were read 24 to 48 hours after injection, and if positive, they usually persisted for 72 hours.

Clinical manifestations of endocrine allergy have been divided according to the organs thus involved. In the cases described, involvement of the respiratory, cutaneous, nervous, genital and ocular systems is illustrated. In the respiratory tract asthma and vasomotor rhinitis have been described. Cutaneous manifestations include angioneurotic edema, chronic urticaria and acne. Positive cutaneous reactions have been described in migraine. Premenstrual tension and pruritis vulvae have been identified as due in certain cases to endocrine allergy. Digestive manifestations include nausea, vomiting, diarrhea and epigastric pain during the premenstrual phase. Chronic recurrent conjunctivitis and certain forms of keratitis may be due to hormonal allergens.

Four methods of treatment have been proposed by Zondek and Bromberg; desensitization by the subcutaneous injection of the hormonal allergens in a series of gradually increasing doses, desensitization by the implantation of hormone pellets after the patient has developed a fairly high tolerance for the hormone in question, desensitization by percutaneous treatment with hormone ointment, and elimination of the allergenic hormone by the inhibition of the

gonadotrophic hypophyseal functions with large doses of estrogens or androgens. In the 47 cases treated in this series, the following results were obtained: complete recovery in 51 per cent, improvement in 28 per cent and negative results in 21 per cent.

(The concept of antihormones, as enunciated by Collip some years ago, was accepted by some and denied by others, including Zondek, who was inclined to the belief that instead of involving the production of substances antagonistic to the hormones, such reactions were to be explained along allergic or immunological lines, as are certain other well-known protein reactions. The question has not been entirely clarified, but there are many who believe that continued administration of certain hormones, especially the gonadotrophins, does actually incite the formation of antigonadotrophic principles. With other hormones, like the estrogens or thyroid, there seems to be very little evidence on this point.

It is rather surprising that in the studies of Zondek and Bromberg, gonadotrophins were not included in the hormones tested. I do not believe that clinicians are often much concerned about allergic reactions with estrogen therapy. They are more apt to be more on their guard from this standpoint when they employ the various commercial gonadotrophic preparations, and the manufacturers themselves often warn physicians as to the importance of preliminary intradermal tests.—Ed.)

## FURTHER STUDIES ON ANTIGONADOTROPHIN FORMATION FOLLOWING GONADOTROPHIC HORMONE ADMINISTRATION

J. H. LEATHEM

*Rutgers University, New Brunswick, N. J.*

*Am. J. Physiol.*, 148: 700-707, 1947

In these experiments, antigonadotrophic formation against a combination of sheep anterior pituitary extract and human chorionic gonadotrophin could be induced more rapidly in the rabbit by the subcutaneous route than by intravenous administration. These inhibitory substances generally disappeared within 20 to 40 days. It was found that antigonadotrophins form more readily and persist for a greater length of time following hormone administration in a reinjection series.

The non-specific inhibitory nature of the antigonadotrophins was shown by the ability of the serum to nullify the gonadotrophic action of pregnant mare serum and human chorionic gonadotrophin in the male and female rat.

A pronounced inhibitory effect on the reproductive system of male mice was observed following the administration of the anti-gonadotrophic serum.

(See comment on preceding paper, by Zondek and Bromberg.—Ed.)



FRENCH RECENT ACHIEVEMENTS AND CONTRIBUTIONS  
IN ENDOCRINE THERAPY

G. GODLEWSKI

Med., Cir., Farm., 129: 1-8, January 1947

Different procedures of endocrine therapy used in France are reported in this paper, which were observed by the author while working at different hospitals in Paris. The progress made in this field was, of course, greatly affected by the conditions created by the war. Since Novak's curette came into use, treatment of menstrual disorders has taken a new route. By means of this instrument, 3 main endometrial patterns can be obtained: a) atrophic type, often encountered in amenorrheas, in which production of artificial cycles is indicated by successively using gonadotrophic, estrogenic and progesterone hormones; b) pure follicular type, often found in hypomenorrheas and dysmenorrheas, which respond to progesterone; c) folliculo-lutein type, which corresponds to the physiologic balance.

In the treatment of amenorrheas and severe dysmenorrheas, novocain infiltration of the superior cervical ganglion has gained great prestige. The injection is done with 20 cc. of a solution of novocain (1:200), repeated usually 2 or 3 times with a few days interval in between, alternating on the right and left side. This generally is sufficient to re-establish menstrual function, through stimuli carried to the anterior pituitary gland receiving the sympathetic fibers of the superior cervical ganglion. Many cases were successfully treated by the author by using this method.

The subcutaneous implantation of hormones is becoming very popular in France. Aside from its major indication—Addison disease—it has a definite application in gynecological endocrinology. Implantation of tablets of estrogen (estradiol benzoate) has been successfully carried out in: a) spontaneous menopause and after total hysterectomies accompanied by severe vaso-motor symptoms; b) bilateral oophorectomy with preservation of uterus; c) primary amenorrhea; d) Babinski syndrome and acromegaly accompanied by a symptomatologic picture of castration; e) hyperplasia of the breast and severe pruritus of the vulva.

As to the use of implantation of crystals of progesterone, there has been so far little experience. Its major indications are in repeated abortions and metrorrhagia hemorrhagica. Implantation of crystals of testosterone has been used by Gennes in the control of bleeding accompanying uterine myoma.

A case is reported showing the good results obtained in cancer of the breast with metastases to the bones, by implanting crystals of testosterone (6 crystals of 100 mg. renewed every 15 days). After 90 days the condition of the patient was greatly improved.

(It is quite true that the French school has made valuable contributions to female reproductive physiology, and this work has probably not been fully appreciated in this country. In the field of organotherapy, however, our French colleagues are floundering

gonadotrophic hypophyseal functions with large doses of estrogens or androgens. In the 47 cases treated in this series, the following results were obtained: complete recovery in 51 per cent, improvement in 28 per cent and negative results in 21 per cent.

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(See comment on preceding paper, by Zondek and Bromberg.—Ed.)

32 always late and 9 usually late. These patients presented varied complaints such as cramps, aching and bearing down in the pelvic area, soreness of breasts, mental depression and numerous nervous symptoms. The patients attributed their symptoms to late menstruation, and undoubtedly the menstrual irregularities created psychological problems. No organic pathology was found on examination. Each girl's uterus was small and underdeveloped.

Pregneninolone was administered orally in 5 mg. tablets, with a daily dose of 5 mg. in 40 patients, 10 mg. in 5 patients and 15 mg. in one patient. Most patients were treated 18 days of the menstrual cycle to menstruation. The duration of treatment varied from one month to 20 months.

Thirty-two of the 41 patients with oligomenorrhea or secondary amenorrhea showed improvement in their menstrual cycles. Thus, 78 per cent of the girls with late periods had cycles nearer to 28 days. Of 5 patients who had not menstruated in over 6 months, only one had periods while being treated. Of 33 patients with cycles of 3 months or less, 29 (87 per cent) showed improvement. Follow-up of 6 months or longer on 30 of these patients showed that 18 reverted to longer cycles after treatment was discontinued. Treatment was unsuccessful in the 5 girls who had never menstruated.

Of 22 patients with dysmenorrhea, 16 were improved and one was made worse. Of 22 patients with various nervous symptoms, 14 were benefited. There was definite psychological improvement when the patients menstruated on time. The author concludes that pregneninolone is beneficial for some selected patients, particularly those with severe nervousness or dysmenorrhea when advice and observation do not suffice. For patients who obtain relief from this hormone, its administration is believed preferable to parenteral endocrine therapy or to large dosage with sedatives. Pregneninolone is given to prevent the occurrence of symptoms rather than to relieve those present.

(In general, I believe it is rather meddlesome and unwise to institute any form of endocrine therapy in girls not over 17, and often older. In going over the author's table of ages for this group of 46 girls I find that only 6 were over 17. I am afraid, therefore, that I shall have to be recorded as thoroughly disapproving the indications of treatment in this series of patients. I cannot imagine why anyone should wish to resort to endocrines because a girl of 11, or 12, or 13, or 14 has not yet menstruated, and yet about one third of the author's patients were of these ages. In somewhat older adolescents, there may be an occasional patient with some obvious endocrinopathy of which amenorrhea may be but one manifestation, and in which some form of organotherapy may be justified. In the overwhelming majority of cases, however, much more benefit and far less harm will follow from simple constitutional and general hygienic measures.

I wonder why anyone bothers to report results in the treatment of amenorrhea, or for that matter, functional bleeding, in patients of this age. Without any endocrine treatment of any kind the majority of such patients sooner or later become essentially normal from a menstrual standpoint, and statistics of "cures" and "improvement" following endocrine therapy mean almost nothing. Incidentally, I wonder why pregneninolone was chosen for this particular therapeutic exploit, especially since the method of use was quite different from that embodied in the plan of Zondek to which the author makes reference.—Ed.)

about with the rest of us. The author states that subcutaneous implantation of ovarian hormones is becoming popular in France, but in our own country one gets the impression that it has lost what little popularity it ever had. I confess that I do not see the slightest advantage in treating menopausal symptoms by this method, and on the contrary, there are real disadvantages. It may be granted that it keeps up a persistent, though always uncertain, dosage of estrogen for a considerable time. But this is exactly what we do not want in such patients.

Estrogen, when indicated at all, should be given only when and if the symptoms are sufficiently troublesome, and certainly not constantly. The now cheap and effective oral therapy which most of us use is far more flexible than pellet implantation, the dosage being increased, decreased or withdrawn at will, according to the symptomatology of the patient. The idea that a menopausal woman needs a persistent "maintenance" dosage of estrogen is, I believe, a pernicious one. It has been responsible for much unnecessary and, before the days of cheap nonhormonal estrogens, expensive medication, it has not infrequently caused postmenopausal bleeding, and I believe it has actually increased the duration of the menopause through the vicarious ovarian activity which it involves.

It is better to get the pituitary-ovarian readjustment over with as soon as possible, using estrogen therapy only as a temporary makeshift when the severity of the vasomotor symptoms calls for it. While it is true that implanted pellets can be removed when necessary, the method impresses me as not comparable with oral therapy in ease, convenience and flexibility. The conditions are very different from those seen in Addison's disease, when there may be a real need for constant hormone supply, and where there would therefore be more logic in pellet implantation.

The plan of treating amenorrhea and dysmenorrhea with novocain infiltration of the superior cervical ganglion is at least unique, although one may justifiably be somewhat skeptical about a method which purports to relieve on the one hand, a disorder often due to loss of ovarian hormone activity and one which, on the other hand, is associated characteristically with full ovarian activity, i.e., both menstruation and ovulation are normal. I had heard of this plan some months ago from a French gynecologist who visited me in Baltimore, and who told me of the enthusiasm for this treatment at the Hotel Dieu in Paris, where I believe this method of treatment originated. It appears to be based on the concept that pituitary function is reflexly, and presumably always favorably, influenced by the novocain injection into the superior cervical gland. In spite of the good results reported by our French colleagues, it is not uncharitable to say that the healthy attitude toward the plan should for the present be one of "scientific skepticism."—Ed.)

## EFFECT OF PREGNENINOLONE ON THE MENSTRUAL CYCLE OF ADOLESCENT GIRLS WITH OLIGOMENORRHEA AND AMENORRHEA

F. E. HARDING

*Los Angeles, Calif.*

*Ross-Loos Medical Group*

*Am. J. Obst. & Gynec., 53: 279-284, 1947*

Forty-six adolescent girls aged 11 to 19 years were treated with pregneninolone. All were single. Five had never menstruated; the others menstruated irregularly,

## A PRELIMINARY EVALUATION OF DIENESTROL IN THE MENOPAUSE

RITA S. FINKLER AND SYLVIA BECKER

*Newark, N. J. Newark Beth Israel Hospital*

*Am. J. Obst. & Gynec., 53: 513-519, 1947*

This study concerns the authors' experiences in treating 73 menopausal patients with orally administered dienestrol. Daily doses ranged from 0.2 mg. to 1.5 mg., according to the severity of symptoms. The average age of these patients was 48.5 years. Approximately 50 per cent of the group had received previous estrogenic therapy in some other form.

The symptoms were the usual ones associated with the female climacteric. In 58.9 per cent of the cases, the symptoms were due to spontaneous menopause; in 21.9 per cent to hysterectomy. Flushes were present in 87.6 per cent; nervousness, sleep disturbances and headaches were the next most frequently encountered symptoms. The efficacy of dienestrol therapy was determined by its effect on symptoms and by vaginal smear examination.

No appreciable effect of therapy was noted in 3 patients who were suffering from other medical complications. Prompt relief of symptoms was reported by the remaining 70 patients (95.9 per cent). Improvement in vaginal smears generally corresponded with the clinical improvement reported. Only 5 patients (6.8 per cent) complained of pelvic congestion when dienestrol was continued over a long period of time. There were 2 instances of withdrawal bleeding, but these were very mild and of short duration. The incidence of nausea was limited in this series to one case (1.3 per cent), and the absence of other toxic effects makes this preparation particularly commendable.

Six case reports are presented. 4 figures.

(Manufacturers are constantly striving to prepare new oral estrogens, usually of the non-hormonal type, to take the place of diethylstilbestrol, which does have the disadvantage of producing unpleasant side-effects in from 10 to 15 per cent of patients. A good many such oral estrogens are now available, some of which are definitely less toxic than stilbestrol. Dienestrol is too new to permit of complete evaluation, but my own observation, during the comparatively short time in which I have used it in at least some of my patients, leads me to believe that it is not only effective, but definitely less toxic than stilbestrol.—Ed.)

## MIXED SYNTHETIC ESTROGENS—THEIR USE IN THE MENOPAUSE (DIMETHOXY STILBESTROL AND DIETHYLSTILBESTROL)

O. H. BLOOM

*Brooklyn, N. Y.*

*Am. J. Obst. & Gynec., 53: 263-265, 1947*

The writer has found the most efficient estrogenic agent to be dimethoxy stilbestrol (dimethoxy diethyl stilbestrol) dissolved in oil for intramuscular in-

CONTROL OF MENSTRUAL DISTURBANCES AND HYPO-OVARIAN  
STERILITY; NINE YEARS OF EXPERIENCE WITH EQUINE  
GONADOTROPIN

GEORGE JOYCE HALL

*Sacramento, Calif.*

Am. J. Obst. &amp; Gynec., 53: 259-262, 1947

The writer emphasizes the viewpoint that the efficacy of any method of ovarian stimulation is dependent not only on the potency of the materials or modality used, but also on the condition of the patient as a whole and on the receptivity of her ovaries. The first step of treatment in his plan consists of case evaluation of all the patient's physiologic systems with treatment where indicated. An effort is then made to supply each patient with estrogen and progesterone, or anti-estrogenic materials. He has used the vaginal smear as a criterion of the responsiveness of the patient to the administration of these substances. Routinely, no patient received gonadotropic stimulation until the use of estrogens and progesterone has produced a satisfactory vaginal smear.

During the present investigation, equine gonadotropic hormones have been administered from the eighth to the eleventh day of the ovarian month. For a time, material which permitted a daily dose of 2,000 international units was employed, and it seems that the results were far better with this material than when the dose was 200, 400 or 500 I. U. daily.

A total of 1937 patients is included in this study. Cases of amenorrhea, dysmenorrhea, hypomenorrhea and oligomenorrhea and anovulatory sterility were given preliminary estrogen-progesterone therapy. Patients with menometrorrhagia were given preliminary antiestrogenic material (prolactin, testosterone, progesterone, acetosy-pregnenolone). Of 37 cases of primary amenorrhea, 16.2 per cent were cured; of 81 cases of secondary amenorrhea, 82.7 per cent were cured. Of 357 cases of dysmenorrhea, 74.2 per cent were cured. Of 952 cases of hypomenorrhea and oligomenorrhea, 55.0 per cent were cured. Of 473 cases of menometrorrhagia, 82.9 per cent were cured. Of 301 cases of anovulatory sterility, 52.4 per cent were cured.

With this plan of treatment in a series of selected cases over a period of 9 years, better results appear to have been obtained with equine gonadotropin than with any other material used for ovarian stimulation.

(This is a large series of cases and the results reported certainly compare very favorably with those of the many other plans which are constantly being recommended for the various menstrual disturbances. The sequence of estrogen-progesterone followed by the equine gonadotrophic hormone is as nearly rational as one can expect in the present state of our knowledge. One cannot help wondering, however, why the same treatment cures so many disorders in which the pathologic physiologic disturbance is so different.—Ed.)

## THE MENSTRUAL CYCLE

### THE TREATMENT OF AMENORRHEA IN YOUNG WOMEN

L. M. RANDALL

*Rochester, Minn.*

*Mayo Clinic*

*Am. J. Obst. & Gynec., 53: 453-458, 1947*

Eighty-seven patients who had experienced amenorrhea for a year or longer were treated by combinations of the methods described in this paper. The follow-up period for this group ranged from one year to 6 years, with an average of 2 years and 3 months.

Seventeen of the 87 patients had amenorrhea because of failure of ovarian function; in 10 (58.8 per cent) the menses reappeared after treatment. In 36 of the 87 patients the amenorrhea was associated with failure of the pituitary body; 26 (72.2 per cent) responded to treatment. Fifteen of the 87 patients experienced amenorrhea in association with anorexia nervosa; 8 (53.3 per cent) responded to treatment. Nineteen of the 87 patients had primary amenorrhea; 3 (aged 19, 21 and 23 years, respectively) began to have menses after treatment.

The aim of the plan of treatment outlined in this paper is, first, to secure an environment or general bodily condition in which the nonfunctioning or poorly functioning glandular tissues will have the best chance to function. Second, when this has been secured, effort is made to stimulate and to maintain function.

Nutrition assumes great importance in all bodily functions in young persons. The tissues concerned with the menstrual function seem particularly sensitive to deprivation of proteins and vitamins. When the patient is markedly underweight or anorexia nervosa exists, a daily caloric intake well above the daily requirement for that particular patient must be maintained for several months. When these patients respond to increased diet there is, coincident with the gain in weight, a return of the basal metabolic rate from low to normal without the administration of thyroid extract. Cyclic administration of estrogens may be commenced as soon as feasible in an attempt to shorten the period of uterine atrophy commonly seen in these patients.

When the uterus is considerably reduced in size, and particularly when microscopic examination of the endometrium reveals atrophy, it is advisable to commence cyclic administration of estrogens. A simple method for this is to use diethylstilbestrol to the daily limit of tolerance. This form of treatment primes the uterus and endometrium and prevents further atrophy, and encourages stimulation of the pituitary body. Also, if the uterus and endometrium make no response to adequate amounts of estrogen and progesterone, it may be assumed

jection. A preliminary report (1944) of 49 cases cited the results obtained in the treatment of the menopause and the suppression of lactation. Further results are reported in this paper with this stilbestrol derivative in 56 menopausal patients.

Slow absorption from the oil solution and prolonged demethylation were considered the rationale for the use of dimethoxy stilbestrol. This was borne out by the preliminary report and the present study. The previously recommended dose of 90 mg. (weekly injections of 30 mg.) gave adequate relief for a long period of time, but there was a lag for a week before relief of symptoms became manifest. Furthermore, it was found that adequate relief could be obtained with a total of 45 mg. (weekly injections of 15 mg.). Therefore, the method of therapy used in the present series consisted of weekly injections of 15 mg. of dimethoxy stilbestrol in combination with 1.0 mg. of stilbestrol, in oil, for 3 weeks. The degree of well-being experienced by the patients was dramatically out of proportion to the small amount of stilbestrol added. The explanation offered by the writer for this phenomenon is a synergistic action between the stilbestrol and the dimethoxy stilbestrol.

As in the earlier series, there was complete relief from all symptoms of the menopause in the new series of 56 patients. The average number of symptom-free days in both groups was 144. Scant bleeding which did not recur and required no treatment was observed in 3 cases, and was regarded as withdrawal bleeding. Three other cases of bleeding occurred in patients previously curetted and irradiated for endometrial hyperplasia. Obviously, the use of estrogen is ill-advised in the treatment of menopause following radiation.

The author concludes, as a result of experience in the 105 cases, that the combination used is the most desirable estromimetic agent. The slow absorption and metabolism of the drug makes for the realization of less frequent dosage, prolonged action and absence of toxic reactions. 1 figure.

(While I have had no experience with this particular estrogenic preparation, and while I have no doubt that, like all other estrogens, it is effective and while it may, as the author says, have less toxic effect than oral stilbesterol, it still has the rather serious drawback of calling for hypodermic administration. Each course requires only weekly injections for three weeks, but this series would no doubt have to be repeated from time to time as the symptoms required. The large number of effective oral estrogens now available, some with very little toxic effect, makes hypodermic medication for vasomotor symptoms almost never necessary. I do not believe that I have used it in a single case for a number of years. —Ed.)



## DYSMENORRHEA

D. D. PHILLIPS, JR.

J. Bowman Gray School Med., 5: 27-32, 1947

In this paper the author considers only the problem of primary dysmenorrhea, discussing the pathogenesis and treatment.

The psychogenic element is one which can never be lost sight of in the management of dysmenorrhea. Haman found that the average pain threshold of a group of dysmenorrheic patients was lower than that of the average each of 100 nondysmenorrheics, 100 postmenopausal women and 100 males. The highest average pain threshold of any group was noted in the postmenopausal women. Those who had a history of dysmenorrhea showed a lower threshold than those with a history of painless periods. He concluded that an intrinsic factor in the constitution of the dysmenorrheic patient renders her more susceptible to pain than the nondysmenorrheic individual.

Various possible mechanical factors in the pathogenesis of dysmenorrhea are discussed. Wilson and Kurzrok found that during the middle 2 weeks of the 28-day cycle the uterine contractions are characterized by small amplitude, short duration, short interval between contractions, and high tonus. In the week preceding menstruation, the contractions gradually increase in amplitude and duration and decrease in frequency and tonus. The maximum amplitude is usually reached at the onset of menstruation. The larger contractions are produced by corpus luteum activity in conjunction with the estrogenic hormone. Thus, it is evident that the occurrence of dysmenorrhea coincides with the phase of maximum uterine motility. Only women who have a corpus luteum can have functional dysmenorrhea.

Some believe that dysmenorrhea is a manifestation of an estrogenic deficiency; others claim that an excess of progesterone is the cause. Sturgis and Albright observed that the presence of a normal corpus luteum seemed to be a prerequisite for the occurrence of cramps. Estrin therapy was followed by a pain-free period only when it prevented the formation of a functioning corpus luteum. They produced dysmenorrhea in a non-ovulating patient by the administration of progesterone. Evidence suggests that cramps are due to some result of progesterone action such as a secretory endometrium, rather than simply to its presence in the system.

All patients with dysmenorrhea should have complete histories and physical examinations, and the physical and mental hygiene should be improved. Symptomatic therapy consisting of analgesics, antispasmodics, heat and exercises should be tried first. Endocrine therapy and surgical intervention should be resorted to only in very severe cases where other methods have repeatedly failed. Hypnosis may benefit those patients whose symptoms can definitely be attributed to psychic disturbances.

that the Müllerian duct is naturally unresponsive. It seems desirable to restore estrogen levels within the body to normal as soon as possible.

The author discusses certain important considerations relating to the administration of thyroid in the treatment of amenorrhea. The patient's actual basal level of metabolism should be determined before beginning treatment. The writer prefers to elevate the rate rather abruptly, repeating basal metabolic rate determinations after the first and second weeks of treatment, after which the maintenance dose may be determined. The daily maintenance dose is continued indefinitely until the full effect of the readjustment of the basal metabolic rate becomes effective. Even if the basal rate is within the limits of  $-10$  and zero in the presence of amenorrhea, elevation of the rate to  $+5$  per cent may be considered, if it is properly controlled.

Low dosage roentgen-ray therapy to the pituitary body or ovaries, or both, has been employed safely and effectively at this clinic. These treatments often re-establish the menses, but the effect frequently wears off in a few months and must be repeated. Also, better results are obtained when amenorrhea of more than a year's duration is due primarily to pituitary rather than ovarian failure. When a lowered rate of metabolism is found in these patients, the rate is purposely elevated before roentgen treatment, and when the menses reappear, estrogens are administered cyclically. This combined therapy has been more successful than any single method.

Attempts have been made to stimulate the patient's own pituitary body, and only 3 of the 87 patients in this study received extrinsic gonadotrophins.

(In this conservatively written paper, Randall discusses one or two methods of treatment which have been somewhat controversial. One of these is substitutional estrogenic therapy, which has been severely criticized by some, but to my mind unjustly if one appreciates its limitations. Certainly there is no disgrace in substitutional organotherapy per se. If there were, it would be disgraceful to treat diabetes with insulin, Addison's disease with cortical extract, or hypothyroidism with thyroid substance. Randall points out the justification for substitutional therapy in certain cases of amenorrhea, even though one appreciates fully that estrogen is not a stimulant of ovarian function and that it has no direct effect on the ovulating mechanism. With equal justification one can employ, often in combination with estrogens, the still unsatisfactory gonadotrophic principles available, with full appreciation of their limitations and their frequent failure to give results. After all, our endocrine therapy for amenorrhea is still woefully inadequate. This being so, there is all the more reason for making full use of constitutional measures and thyroid, as Randall emphasizes.)

The other point on which gynecologists will differ has reference to their attitude toward low dosage therapy of the hypophysis or ovaries, or both. Randall uses it in some cases, and so do many other excellent gynecologists. Others are afraid of it, chiefly because of the warnings of geneticists, like Little, who find that in experimental animals, it may have a harmful effect, perhaps not on the immediate offspring, but upon later generations. Whether this can be applied to the human, I am sure I do not know. Some clinicians are quite enthusiastic in their use of the method; others, like Randall, much more conservative. The results are certainly not invariably good. I do not criticize anyone who makes use of this therapy in the not infrequent cases of otherwise intractable amenorrhea, although I myself have resorted to it only rarely.—Ed.)

mediately by progesterone during the last 5 days and then withdrawing all treatment.

Radical treatment in the form of surgery or radiation should be reserved for patients in whom a preservation of menstrual, reproductive and sexual function is needless. 3 figures.

(A satisfactory short review of the subject. The author states that "microscopic examination of the endometrium at the time of actual hemorrhage rarely shows evidence of progesterone secretion." I believe it will in the not infrequent cases of functional bleeding of ovulatory type, if the curettage is done at the beginning of the bleeding phase, before desquamation, degeneration and autolysis destroy the histological evidence of progesterone activity.—Ed.)

## FUNCTIONAL UTERINE BLEEDING

R. J. CROSSEN

*St. Louis*

Rocky Mountain M. J., 44: 125-129, 1947

This paper constitutes a discussion of functional uterine bleeding, with reference to the changes in the spiral arterioles and the hormonal factors involved in uterine bleeding. The importance of detailed local, general, and blood examination as aids in differential diagnosis is stressed. Various aspects of treatment are outlined, including regulation of diet, with special attention to an adequate supply of vitamins, thyroid therapy when indicated, estrogen, progesterone and testosterone administration, and treatment with surgery and radiation. Curettage is placed after medical treatment, but it is sometimes necessary before medical treatment for diagnostic as well as therapeutic reasons. Any abnormality of the menses in women in the menopausal age group requires curettage to rule out carcinoma and radium treatment to stop ovarian activity.

## RADIUM AND ROENTGEN THERAPY IN THE TREATMENT OF MENOPAUSAL UTERINE BLEEDING

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Am. J. Obst. & Gynec., 53: 199-206, 1947

From this study it is concluded that in uterine bleeding due to benign causes, the method of treatment in well-selected uncomplicated cases is radiation therapy.

## THE TREATMENT OF FUNCTIONAL UTERINE HEMORRHAGE

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Am. Practitioner, 1: 198-202, 1946

Functional uterine bleeding comprises from 10 to 20 per cent of all gynecologic disorders. Parous women are most likely to be affected and a greater percentage of cases occurs near the beginning and near the end of the menstrual epoch.

The author discusses the etiologic factors involved. Schröder and Robert Meyer both emphasize the absence of a functioning corpus luteum. It is postulated that there is either an actual or relative increase in the amount of follicle-stimulating hormone, or a decrease in the amount and effectiveness of the luteinizing principle which in many cases is responsible for the ovarian changes. Well over half of all patients with functional menorrhagia and metrorrhagia show proliferative endometrium and a large percentage show frank hyperplasia. Microscopic examination of the endometrium at the time of actual hemorrhage rarely shows evidence of progesterone secretion. Both stromal and epithelial elements contribute to the increased thickness of the endometrium. Frequent mitotic figures may be seen. There is much disparity in size and shape of the glands. A majority of them may be small and fairly typical of those seen in the early proliferative stage, while others may be enlarged and cystic, thus producing Swiss-cheese hyperplasia. Localized areas of necrosis are not uncommonly seen.

The diagnosis of functional bleeding is made to a large extent by exclusion of both systemic and pelvic pathology. The diagnosis is confirmed by microscopic examination revealing an endometrial pattern other than that characteristic of the menstrual phase of the cycle. Usually the endometrium is proliferative or hyperplastic.

In treatment, general medical measures designed to correct nutritional deficiencies, foci of infection and minor metabolic disturbances are important in all age groups, but particularly in patients near puberty.

Because of the complex nature of the endocrine system and because many disturbances of the ductless glands may be involved in a given case, any single form of glandular therapy will not always prove beneficial. Favorable results are uniformly reported by the use of the luteinizing principle of the hypophysis derived from the urine of pregnant women. Pituitary gonadotrophins are supposedly effective by means of their influence on the ovary in producing ovulation and the formation of a corpus luteum.

Favorable results have also been reported with the administration of progesterone. The use of estrogenic substances alone has given discouraging results in several reported series. The highest degree of effectiveness is reported with the use of cyclical therapy using estrogens in the early part of the cycle followed im-

X-ray and radium have been godsend in the group of patients indicated by the authors, saving many from the hysterectomies formerly necessary in the intractable functional hemorrhage so common in the premenopausal epoch. As the authors also indicate, such treatment also finds wide application in the management of the smaller myomas, associated with troublesome bleeding, in women approaching the menopause. Not only is bleeding permanently checked, but the tumors undergo marked regression. Furthermore, the tendency to sarcomatous change in myomas is far less than some gynecologists appear to realize. A critical averaging of the published studies of many thousands of cases would probably show an incidence of not over 1 per cent.—Ed.)

The material for this study is based on a survey of 412 consecutive cases in which a course of radium (296 cases, or 71.8 per cent) or roentgen-ray therapy (116 cases, or 28.05 per cent) was administered to control idiopathic bleeding. Follow-ups have been made from 2 to 7 years after treatment.

The roentgen dose for the production of a permanent menolysis is approximately 500 r into the midpelvis and attained through 2 fields, one suprapubic and one sacral. The radium dose which assures a complete amenorrhea is about 1800 mg. element hours. Further radiation is never necessary when this total dosage is given. Diagnostic curettage precedes insertion of radium into the uterine cavity.

Of the 296 patients receiving radium therapy, 37 cases were considered to be inadequately treated. Radium treatment was terminated in these cases because of an elevation of temperature 100.6 degrees F. or more that did not respond to antipyretics within an hour's time. However, only 17 of the 37 inadequately treated patients required subsequent irradiation. There were no deaths among the radium-treated cases. Of the 116 cases treated by roentgen ray, 8 required repetition of treatments.

In both groups of patients, curettements were performed by the clinic in 378 cases, and in 34 cases negative microscopic reports were accepted from referring physicians. Curettement and microscopic examination were always repeated in the event of subsequent bleeding. It is emphasized that such patients suffering from uterine bleeding should not be irradiated until all underlying causes have been eliminated and a correct diagnosis established.

The clinical effects of radiation therapy are tabulated. Mild or no menopausal symptoms were present in 51.90 per cent of the series, moderate symptoms in 44.10 per cent and severe symptoms in 3.80 per cent. Mild or no leucorrhea 6 to 8 weeks postirradiative was present in 76.60 per cent, moderate leucorrhea in 22.80 per cent, and prolonged leucorrhea of 20 weeks or more in 0.49 per cent. Immediate, but not prolonged, cystitis resulted in 6.70 per cent of cases. Gastrointestinal symptoms were present in 3.60 per cent. Involutional melancholia was observed in 0.24 per cent of patients.

In the entire series 236 patients had uterine myomas associated with benign uterine bleeding; in all cases the myomas were no larger than a 3 months' gestation, located intramurally. Six patients had complicating cardiac pathology, and one each had active tuberculosis, diabetes mellitus and chronic nephritis. Uterine bleeding in these cases was terminated by radiation therapy to minimize the risk of blood loss and to avoid major pelvic procedures. There were 5 deaths in the entire series (1.2 per cent), but no deaths resulted from sepsis or as a direct result of radiation therapy. 1 figure.

(The roentgen dose advised for abolition of the menstrual function seems rather small and one would think that with such dosage a re-assertion of the function would at times be noted. There are marked variations in individual ovaries in this respect. In some the functional activity may be permanently destroyed by comparatively small doses, while in others even rather heavy dosage may produce only temporary abolition of function, necessitating further radiation later.

In 4 years of observation, not one case showed a tendency toward vulvar carcinoma. For this reason, the writers do not think that leucoplakia is a neoplastic disease. 6 figures.

(The results reported in this group of patients after Vitamin A therapy, obviously suggested by the antikeratotic effects of this vitamin principle, are certainly better than could be expected after any other form of non-surgical treatment. Leukoplakia is a disease which has been notoriously resistant to all forms of local or general medicinal treatment, and gynecologists have always felt that there is a definite hazard with such conservative measures in a disease which so often is a precursor of vulvar cancer. If the good results reported by the authors are substantiated by their own further observations and by the work of others, the proportion of cases requiring surgical treatment may be greatly lessened. —Ed.)

## FIBROADENOMA OF SUPERNUMERARY MAMMARY GLAND TISSUE IN VULVA

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*University of Western Ontario and Victoria Hospital*

*Am. J. Obst. & Gynec., 53: 335-337, 1947*

A 47 year old woman complained of menorrhagia and an abdominal tumor. Physical examination revealed the presence of uterine fibroids and a firm, non-tender, freely movable lump on the right side of the perineum. This lump had been present and remained stationary in size for some years. Hysterectomy was performed and the lump in the perineum was excised.

The perineal mass measured 3.0 by 2.0 by 1.3 cm. and was encapsulated. Its cut surface was uniformly grayish-white and solid. Microscopic sections showed well developed breast tissue presenting the pattern of growth of a pericanalicular fibroadenoma. The tumor was benign.

Embryologically, supernumerary breasts may be found at any point along the mammary ridge or "milk line" running from the axilla through the lateral border of the pubic region to end on the upper medial surface of the thigh. The abnormality is rarely encountered in the vulva. 2 figures.

(Supernumerary mammary gland tissue in the vulvar region is rare. When it occurs, it may grossly resemble either fibroma or hidradenoma. Microscopically, it might be mistaken for the latter, although the distinction is usually easily possible to anyone familiar with the normal histology of the breast and the characteristic histological pattern of hidradenoma. A few rare cases of primary adenocarcinoma of the vulva have been thought to have developed in aberrant mammary tissue, though this has not been established beyond doubt.—Ed.)

## VULVA AND VAGINA

### LEUCOPLAKIA VULVAE; ITS ETIOLOGY AND RESULTS OF TREATMENT WITH VITAMIN A; PRELIMINARY REPORT

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Am. J. Obst. & Gynec., 53: 214-220, 1947

This investigation comprises a group of 18 patients, in all of whom the diagnosis of leucoplakia vulvae was verified by histologic examination. Vitamin A treatment was begun on all patients immediately after complete examination, supplemented by histologic proof. The daily oral dosage varied from 250,000 to 500,000 units, supplemented by injections of 50,000 units twice weekly. Each patient also received 15 minims of dilute hydrochloric acid in water with each meal. In some patients subjective symptoms were relieved within several weeks; in others it was necessary to increase the amount of vitamin A before relief was manifested. Parallel to the degree of freedom from symptoms, the previously dry, indurated, glossy and wrinkled external genitalia became moist; the folds became fuller and the indurated skin became pliable. Histologic examination of repeated biopsy specimens revealed marked alteration in the degree of acanthosis and keratinization. Of the 18 patients treated, 14 were relieved both subjectively and objectively. The 4 unimproved cases suffered from some constitutional disease. Two were diabetic, one syphilitic and one had a cardiovascular-vascular lesion. In the opinion of the authors, the presence of these complications interfered in some way with the proper assimilation and utilization of vitamin A.

This form of therapy was based on the authors' conclusion that leucoplakia vulvae is of metabolic origin, due to a failure in utilization and/or absorption of vitamin A. All of the diagnostic tests performed on the present series of patients were negative with the exception of the gastric contents examination, which in about 60 per cent of cases showed little or no free hydrochloric acid. This incidence of anacidity is definitely abnormally high, compared to the normal physiologic incidence of 35 per cent for any similar age group. Clinical studies in other fields have shown the relationship existing between gastric anacidity and the low plasma level of vitamin A. In the authors' cases plasma levels of vitamin A were normal, and, therefore, the leucoplakia vulvae may be considered as being due to a subclinical deficiency of this vitamin. The hyperkeratosis and acanthosis seemed a logical indication for the use of vitamin A therapy, as the role of this vitamin in ectodermal physiology is well known. Wolbach and Howe have demonstrated that in continued absence of vitamin A from the diet, the most prominent changes are a transition in which the normal epithelium in various parts of the body is replaced by keratinized epithelium.



## THE TREATMENT OF MYCOTIC VULVOVAGINITIS WITH PROPIONATE VAGINAL JELLY

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*Duke University School of Medicine and Duke Hospital*

Am. J. Obst. & Gynec., 53: 241-244, 1947

The authors report the use of propionate vaginal jelly in the treatment of mycotic vulvovaginitis in a group of 54 patients. This vaginal jelly contains calcium and sodium propionate as the active ingredients. All of the patients had positive cultures for some species of *Candida*; 53 of the strains were identified as *Candida (Monilia) albicans* and one strain as *Candida (Monilia) stellatoides*. The primary symptom was itching of the vulva. The most frequent physical findings were a cheesy, white, flaky vaginal discharge, and hyperemia of the vaginal mucosa and vulvar areas. The patients delivered one applicator full of jelly (8. to 10 cc.) on arising in the morning and one applicator of jelly at night, into the upper vagina, also applying a small amount of jelly to the external genitals. Treatment varied from 2 to 3 weeks. After its completion, patients waited 2 days, used no douches or medication, and then returned for follow-up cultures. Patients with negative cultures at this time, who were asymptomatic and had negative physical findings, were regarded as cured.

All of the patients received relief from pruritis within 76 hours. Of 30 non-pregnant patients, 80 per cent showed negative cultures after one series of treatments. Of 24 pregnant patients, 39 per cent were cured, as proved by culture, after one series of treatments. However, all the pregnant patients obtained symptomatic relief as readily as the nonpregnant patients.

The authors find that the propionates in a vaginal jelly offer definite advantages over other forms of available treatment. The jelly is entirely innocuous, convenient to use, and does not stain the clothing.

(The time-honored treatment of mycotic vulvovaginitis is the local use of gentian violet, usually in 1% aqueous solution. This is often rather promptly effective, but there are not a few exceptions. The authors were led to the use of the propionate jelly through the studies of Keeney and his associates in 1944, these indicating a definitely antifungistic effect. The method seems simple enough and the results reported appear to justify its further use.—Ed.)

## THE FORMATION OF AN ARTIFICIAL VAGINA WITHOUT OPERATION

J. B. DAWSON

New Zealand M. J., 44: 132-133, 1945

The author reports the successful construction of an artificial vagina in an 18 year old girl by means of a non-operative procedure previously described by Frank

## LYMPHOGRANULOMA VENEREUM

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School of Medicine*

Am. Practitioner, 1: 371-374, 1947

The authors discuss the etiology, symptoms, physical findings, differential diagnosis, pathology and treatment of lymphogranuloma venereum. This disease, which is caused by a filterable virus, transmitted by sexual inoculation, is manifested in the acute stage by a primary genital papule or ulcer. Spread of the disease is accompanied by secondary infection, edema, lymphadenopathy, pain, tenderness and suppuration. Associated with the acute stage are fever, chills, headache, vertigo, backache, anorexia, nausea and joint pains. Chronic symptoms of the disease range from vulvar ulceration and hypertrophy to vesicovaginal and rectovaginal fistulae.

Inguinal adenitis is often the primary complaint. The degree of local tissue destruction and distortion is in line with the lymphatic drainage from the inoculation area. The fourchet is a very common area of involvement. Acute infection may be followed by a perirectal stricture. In the acute stage, the labia become brawny, indurated, hypertrophied, with large everted hair follicles and ulceration. Hypertrophy of the clitoris is common. Peri-urethral infiltration may result in destruction and fibrosis of the sphincter muscles.

As regards differential diagnosis, it is not uncommon to find syphilis, post-chancroidal disease, gonorrhea, fusospirochetal infections and trichomonas complicating lymphogranuloma venereum. Also, tuberculosis, cancer and granuloma inguinale must be considered. The writers present a chart listing the differential tests for ulcerative lesions of the genitalia.

In the acute phase of lymphogranuloma venereum, sulfadiazine will arrest infection and cause complete healing of tissues not necrosed or extensively fibrosed. Sulfaguanidine or sulfasuxadine are of value in reducing secondary infection prior to dilatation of strictures or plastic surgery involving the bowel. Frei antigen, in increasing doses, has been used with beneficial results. 6 figures.

as to the cause of bleeding. Her blood pressure was 120/70, pulse 80 and of good volume. Pelvic examination revealed a fresh, bleeding laceration, about 3 cm. in length, to the right of the cervix, extending through the thickness of the vaginal mucosa. The laceration was repaired under sodium pentothal anesthesia. Upon further questioning, the patient admitted having had intercourse which was painful and was immediately followed by vaginal bleeding. She had not had sexual intercourse for the past 16 years.

(In this case one would be inclined to think that the senile thinning of the vaginal mucosa and the inelasticity of the vaginal wall in general, might have contributed to the coital injury.—Ed.)

## ABSORPTION OF PENICILLIN FROM THE VAGINA

M. A. GOLDBERGER, R. I. WALTER AND L. S. LAPID

*New York, N. Y.*

*Mount Sinai Hospital*

*Am. J. Obst. & Gynec., 53: 529-531, 1947*

The writers report that penicillin in the form of suppositories is readily absorbed through the vagina, and suggest that this method may prove to be the method of choice for the administration of penicillin in the adult female.

Ten gynecological patients were given 5 suppositories of calcium penicillin (100,000 units each) in a base of cocoa butter, placed in the vagina at one time. After the intravaginal administration of 500,000 units the average penicillin level in the blood was 0.38 units per cc. of serum at the end of 30 minutes; 1.35 units per cc. at the end of one hour; 0.96 units at the end of 2 hours; and 0.38 units at the end of 3 hours. Before treatment, the vaginal pH varied between 4.1 and 7.0. Five hours after treatment the pH varied between 6.3 and 7.5. In a control series of 5 women treated with plain cocoa butter suppositories, vaginal pH was unchanged after 5 hours. The average total urinary excretion of penicillin in 24 hours was 91,957 units.

in the *Am. J. Obst. & Gynec.*, 35. Frank found that by making an incision in the hymeneal region, the tenuous tissues separating the rectum from the urethra and bladder became readily accessible, and with a few penetrating movements of the fingers the peritoneal fold of Douglas was easily reached. By gradually forcing inwards the mucous membrane in the introital region, a vagina was established.

Dawson's patient possessed rather small ovaries and a mass of muscular tissue representing the uterus from which a mere strand of fibrous tissue represented the vagina. The patient had never menstruated. Her external genitalia, with the exception of the introitus which was completely occluded by a flat, thick, elastic sheet of mucous membrane, appeared well developed. Having invaginated the occluding sheet of mucosa into the recto-vesical space for a distance of  $1\frac{1}{2}$  inches, the author continued invagination for 10 days until an artificial vagina of 2 inches was created. The patient suffered no pain or discomfort during the process. A glass vaginal dilator of 1 inch diameter was worn constantly by the patient. However, the constant pressure of the dilator damaged the epithelium, so the invagination was continued thrice daily with the dilator rather than constantly. In this way breadth but not depth was established. Increase in depth was further produced by a pyrex glass test tube. At the end of 2 months' time, during which the patient persevered with the pressure twice daily for a half hour on each occasion, a vagina  $3\frac{1}{2}$  inches in length, lined with smooth, moist and elastic mucous membrane, and which readily admitted 2 fingers or a full-sized vaginal speculum had been formed. Since this paper was written the patient has reported satisfactory marital relationships.

(The construction of an artificial vagina has become a comparatively simple procedure, and good results have been obtained by various techniques. One of the best, and the one which most of us probably employ, is that of Wharton, either with or without skin-grafting. No one nowadays would be justified in carrying out the formidable procedures which were formerly used, such as the Baldwin method of forming the vaginal canal from an excised and transplanted loop of small intestine. Looking back on the 5 cases in which I did the Baldwin operation, I really believe that it gave final results hard to equal by any of the simpler modern methods, the resulting vagina being usually indistinguishable from the normal organ, both anatomically and functionally. In spite of this, the very real hazard of such an extensive procedure has very properly led to its general abandonment.—Ed.)

## VAGINAL LACERATIONS RESULTING FROM COITUS

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*The Roosevelt Hospital*

*Am. J. Obst. & Gynec.*, 53: 539, 1947

A 72 year old white woman was admitted to the hospital because of profuse vaginal bleeding of  $2\frac{1}{2}$  hours' duration. The patient volunteered no information

the cervix being what it should; those in the corpus were 3 times the number to be expected.

The authors mention briefly several fragments of evidence suggesting abnormal estrogenic stimulation as one of the growth-stimulating factors. They have found 31 per cent of uteri curetted for bleeding during the menopause to harbor hyperplastic endometrium. Although constant evidence of endometrial hyperplasia is not found in patients developing corpus carcinoma, findings are noted such as frequency of bloody menopause, delayed menopause and sterility, all of which could be interpreted as evidence of endocrine imbalance.

An increasing number of reports stress the relatively high incidence of corpus carcinoma associated with granulosa-cell (or thecal cell) tumor of the ovary, which is commonly associated with endometrial hyperplasia. Such evidence is extremely suggestive of an estrogen-cancer relationship.

The writers have studied 20 endometria with extreme degrees of hyperplasia produced by long-continued estrogen administration. This response has been found not to be related to the quantity of estrogen given, but rather to the persistent stimulus. The authors have also studied 5 patients with corpus carcinoma, appearing after long-continued estrogen administration, whose histories are strongly suggestive of an etiologic relationship. 8 figures.

(This is a valuable study of the background of women who later develop adenocarcinoma of the corpus. Perhaps the most interesting finding is that women who have had radio-therapeutic induction of the menopause for benign bleeding are  $3\frac{1}{2}$  times as likely to develop later adenocarcinoma than a corresponding normal group. In this respect, their findings agree with those of C. L. Randall (*J. A. M. A.*, 127: 20, 1945). The lesson to be drawn is that such women especially should be instructed to be alert to the possible significance of any postmenopausal bleeding which may develop in later life.

The authors also agree with Crossen and Hobbs (*J. Miss. M. A.*, 32: 361, 1935) that the age of the menopause is definitely higher in the adenocarcinoma group than the average, the peak incidence in their group being between 52 and 54 years. They also report the endometrial findings in 20 patients who had had long-continued estrogen administration, very properly emphasizing the hazard of thus producing various degrees of hyperplasia, sometimes so atypical and proliferative as to simulate actual adenocarcinoma.—Ed.)

## THE SMEAR TECHNIQUE FOR THE DIAGNOSIS OF UTERINE CARCINOMA

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*Marquette M. Rev.*, 12: 98-100, 1947

In this paper the authors present a case to illustrate the ease of diagnosis with the smear technique in uterine cancer. It is suggested that this method can be used in the "screening" of uterine malignancy and that it should become a

## THE UTERUS

### THE BACKGROUND OF CANCER OF THE CORPUS

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*Sloane Hospital for Women and Columbia University*

*Am. J. Obst. & Gynec., 53: 419-431, 1947*

The evidence presented in this paper suggests that women destined to have carcinoma of the corpus are measurably different from other women. The authors suggest that more precise measurements of these differences should be made.

Observations on age, race, weight, marital status, parity and economic condition have been recorded routinely on women suffering from cancer of the corpus. For controls, the group of cases of cancer of the cervix was taken.

The average age of women with carcinoma of the corpus was 6.6 years greater than those with cervical cancer. A proportionate number of Jewish women were among those with corpus carcinoma, while among 765 cases of cervical cancer, there was only one Jewish woman.

The weight of the women with cancer of the corpus was greater than that of women suffering from cancer of the cervix. The difference was 18 pounds, which is 9 times as great as the probable error, and therefore significant.

It was found that 24.8 per cent of 206 women with carcinoma of the corpus were unmarried as against 5.6 per cent of 550 women with cancer of the cervix, a difference of 19.2 per cent  $\pm$  2.13, or 9 times the probable error. Women with corpus carcinoma were more often nulliparous, 38.6 per cent having no children as against 16.6 per cent of women with cervical carcinoma, a difference of 22.0 per cent  $\pm$  2.61, 8.43 times the probable error. Thirty-seven per cent of 81 women with corpus carcinoma were infertile.

Of 308 women with carcinoma of the corpus, 145 (47 per cent) were private patients as against 182 of 765 patients with cancer of the cervix, or 23.8 per cent.

The age incidence of cessation of the menses in corpus carcinoma patients was later than the 48-year average usually given—the peak incidence in this group coming in the 52- to 54-year range. The incidence of excessive and irregular bleeding during the menopause was greater in this group than in the general female population.

Among 1100 women who had received a radiotherapeutic menopause for benign causes of bleeding and were followed for an average of 6.7 years, there were 15 cases of cancer of the uterus, which is  $3\frac{1}{2}$  times as many as would be expected. Nine of these were in the corpus and 6 in the cervix, the number in

(The author, who has during recent years utilized a special injection method of study, has made a number of valuable contributions to our knowledge of the circulation in the uterus and in uterine myomas. In the present study he concludes that red or carneous degeneration of myomas, always a rather poorly understood variety of myomatous degeneration, is to be explained as due to a hemorrhagic infarction, though this is apparently conditioned by some degree of preceding hyaline change. Apparently the vascular accident fundamentally responsible is venous obstruction at the periphery of the tumor. As the author himself states, however, the thin-walled arteries of the growth must rupture, and there must be some degree of local hemolysis, as otherwise it would be difficult to explain the diffusely dusky, reddish color of such tumors, so aptly compared, on cut section, to the hue of partly cooked beef.—Ed.)

### A SIMPLE UTERINE SOUND MARKER

D. J. WEXLER

*Am. J. Surg.*, 72: 767-768, 1946

The writer describes a uterine sound marker which was devised to overcome the inaccuracies of relying on moisture from blood or mucus on the sound to act as a marker. This simple marker, with its indicator, is snapped by a spring clip on the graduated sound. When the tip of the sound has reached the internal os or the superior wall of the uterine cavity, whichever distance is being measured, the marker is pushed forward until the indicator is against the cervix. The sound is then withdrawn and the indicator shows the exact measurement. Even fractions of an inch can be ascertained, so that progress may be judged in cases where one is attempting to develop an infantile uterus. 2 figures.

### DIAGNOSIS AND TREATMENT OF CANCER OF THE UTERUS

H. D. KERR

*Iowa City, Iowa*

*University Hospitals, State University of Iowa*

*Am. Practitioner*, 1: 242-246, 1947

The writer considers first carcinoma of the cervix, which constitutes about 89 per cent of the malignant tumors of the uterus. It occurs most frequently between the ages of 40 and 50 years, but may be found in the aged or youthful. The etiology has a definite relationship to childbirth trauma.

In the earliest stages, carcinoma of the cervix causes no symptoms because there is no ulceration. However, the lesion is still early when ulceration first occurs, and at that time there are symptoms and changes which the physician

part of every physician's routine examination of women of cancer age. Positive smears should be checked by biopsy whenever possible. For the average practitioner there are the disadvantages of complexity, but there is distinct advantage in that the making of the smear can be done by anyone and the slides examined by experienced persons. 1 figure.

## RED DEGENERATION OF UTERINE MYOMAS

R. L. FAULKNER

*Cleveland, Ohio*

*Western Reserve Medical School and University Hospitals*

*Am. J. Obst. & Gynec., 53: 474-482, 1947*

The author considers red degeneration of uterine myomas in the light of what is known of the blood vessels of the myoma. Sampson has shown that the vessels within a myoma inject as arteries, and that veins are concentrated about the periphery of the myoma and, although they may be large, they penetrate the tumor very little or not at all. Myomas vary a great deal in vascularity. Vessels within the tumor, although arteries, are thin walled. Anemic infarction of a myoma is practically unknown except as a gradual process manifest in the ordinary hyaline and cystic degeneration of these tumors.

From the clinical behavior, sometimes acute symptoms and the gross pathologic appearance of the red myoma, it is evident that this degeneration is a vascular accident. Venous obstruction as postulated by Haultain, whether from simple pressure, peripheral thrombosis or mechanical injury, appears as a possible cause of the pathological picture. Blood is pumped into the tumor and cannot get out. The thin-walled arteries of the myoma rupture at many points and extravasation of red blood cells occurs. It would seem that the right degree of hyaline conditioning of the tumor before the vascular accident occurs is necessary before red blood cells are laked and diffusion of pigment takes place.

The writer emphasizes that the time the tumor is seen as related to the vascular accident governs the specific pathologic findings. If studied early enough, it is believed that extravasated red blood cells could be found in all such myomas.

The incidence of symptomatic red degeneration in myomas is generally believed to be 7 to 8 per cent, with most occurring in connection with pregnancy. In the nonpregnant uterus red myomas are usually 10 cm. or more in diameter before there are symptoms or signs enough to make their preoperative diagnosis very certain.

Conservative medical treatment of the acute phases of red degeneration is feasible when the diagnosis is clear, and in pregnancy is highly desirable. 6 figures.



studies. In the case reported above, the original tumor is said to have been of Stage 4 type, which makes the lateness of the recurrence all the more surprising.—Ed.)

# HYDROGEN ION CONCENTRATION (pH) OF THE VAGINA ASSOCIATED WITH AN ECTROPION OF THE CERVIX (CERVICITIS)

K. J. KARNAKY

§

*Houston, Texas*

*Jefferson Davis Hospital and Baylor University School of Medicine*

*Am. J. Surg., 73: 359-362, 1947*

The hydrogen ion concentration of 30 consecutive vaginas with an associated ectropion of the cervix was determined. The average pH of the anterior fornices, was 5.33; of the posterior fornices, 5.41; of the right lateral walls, 5.10; and of the left lateral walls, 5.16.

The author states that one might conclude that a cervical ectropion may be present in a vagina with normal hydrogen ions, if one accepts the normal pH of the vagina to vary between pH 4.0 and 5.0. This has been observed to be true in cases in which the ectropion appeared to be a "dry type." This has not been the finding in vaginas in which there is a profuse cervical leukorrhea.

can find. Both lay and professional education are necessary in order that earlier diagnosis may be made. To examine a woman for a suspected lesion of the cervix requires only a pelvic examination and a biopsy in suspicious cases. The use of the vaginal or cervical smear is becoming more and more recognized as a valuable ancillary method in diagnosis.

The diagnosis of any except the earliest lesions can usually be made clinically, but histologic proof is always advisable. Almost 95 per cent of cervical carcinomas are squamous cell, while the remainder are adenocarcinomas; the author finds that, as regards prognosis, there is little difference.

As regards treatment, it is safe to say that good irradiation is always as good as the best surgery in comparable stages of the disease and has the advantage of no selection. Generally speaking, with radiation, stage I has in the neighborhood of 90 per cent 5-year survivals, stage II, 60 per cent, stage III, 30 per cent and stage IV, practically none.

Usually patients with corpus carcinoma are in the postmenopausal period. Fundic carcinoma is almost always adenocarcinoma. The treatment is usually surgical, with or without pre-operative radium treatment. Only patients who are considered inoperable are treated by irradiation alone.

## CANCER OF THE CERVIX: A LOCAL RECURRENCE EIGHTEEN YEARS AFTER RADIUM THERAPY

E. E. COVINGTON

*Baltimore*

*St. Joseph's Hospital*

J. A. M. A., 133: 935-936, 1947

A case is reported of a local recurrence of squamous cell cancer of the cervix 18 years after radium therapy. As far as the author can determine from the literature, this case represents the longest interval of time on record before such a local recurrence of squamous cell cancer of the cervix.

The patient was 41 years of age when a stage 4 squamous cell cancer of the cervix was proved by biopsy. A total dose of 5,000 mg. hours of radium was given and the patient was followed for 5 years with no evidence of the growth on vaginal examination. Eighteen years later the patient was found to have a stage 3 squamous cell cancer of the cervix. Treatment consisted of roentgen therapy (2,000 r) and intrauterine and contracervical radium (3,600 mg. hours). Two months after treatment the local growth had disappeared and there was no evidence of metastasis. 2 figures.

(A not inconsiderable proportion of the recurrences of cervical cancer, variously estimated at from 10 to 15 per cent, occur after the 5-year limit commonly chosen for statistical

studies. In the case reported above, the original tumor is said to have been of Stage 4 type, which makes the lateness of the recurrence all the more surprising.—Ed.)

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## THE ADNEXA

### A SPIRAL ARTERY IN THE OVARY OF THE RABBIT

S. R. M. REYNOLDS

*Department of Embryology, Carnegie Institution of Washington*

*Am. J. Obst. & Gynec.*, 53: 221-225, 1947

A spiral artery has been discovered in the hilus of the ovary in the rabbit. The ovarian artery makes a right angle turn cephalad as it enters the hilus, where it forms a helix of diminishing diameter extending throughout the length of the hilus. Further vascularization of the ovary is accomplished by secondary branches arising from the coils of the spiral artery. The vessels are demonstrated by photographs accompanying this paper.

The author discusses the speculative implications of this arrangement of the ovarian circulation. The first of these relates to cyclic or periodic ovarian growth. After many pregnancies the rabbit ovary has increased considerably in length. The spiral arrangement of the main artery in the hilus should permit a "paying out" of coils of the helix as the ovary grows. The second implication relates to the hemodynamic aspect of the ovarian circulation. A spiral arrangement of the type demonstrated should permit an orderly reduction of the arterial blood pressure in accordance with known hemodynamic mechanisms. The third implication follows from the first two; if the ovarian spiral artery serves to allow normal adaptation to change in size of the ovary and to provide a mechanism for reducing and equalizing blood pressure throughout the ovarian stroma, then dysfunction, by altered morphologic relationships, or through the inroads of localized vascular degenerative or other types of diseases, may be related to certain types of ovarian pathology whose etiology is now obscure.

Although there is no reason to suspect that this spiral artery of the ovary participates climactically in any normal ovarian function in a manner comparable to the spiral arteries of the endometrium, this should be borne in mind as a possibility in studies of cyclic phenomena in the ovary. 6 figures.

(This is an interesting anatomic observation, though its physiologic significance is not clear, as the author himself states. He has long been a productive worker in the field of reproductive physiology, his most important contribution being in the study of uterine motility. It is quite possible that the significance of the ovarian spiral artery may be related to the cyclical circulatory changes in the ovary, though it is difficult to believe that its importance in this respect would be in any way comparable to the role played by the spiral arterioles of the endometrium.—Ed.)

## DYSGERMINOMA OF THE OVARY

W. C. CUSTER

Surgery, 20: 520-524, 1946

A review of the literature reveals some divergence of opinion as to the benign or malignant state of ovarian dysgerminoma. The incidence of this tumor type among malignant ovarian tumors has varied from 3.1 to 6.3 per cent; in the author's series it was 1.2 per cent. The mortality rate varies between 40 and 60 per cent, with recurrence and metastasis as frequent. Reports of cases of survival (both in the literature and in the author's series) are those in which the primary growth showed no evidence of extension; all those that showed extension at the time of operation died of metastasis. The only hope for these patients is early diagnosis and surgery.

A case is reported of dysgerminoma occurring in a 12 year old girl. The only complaint was an abdominal mass which had been discovered at routine school physical examination. The patient was feminine in type and well nourished with beginning breast development and pubic hair which showed a normal feminine distribution. In the abdomen there was a firm, nontender, irregular, freely movable mass to the left. On rectovaginal examination the uterus could not be differentiated from the mass. Laboratory procedures were normal and chest and bone x-rays were negative. At operation a large mass replacing the left ovary was removed. It was discrete, firm, not adherent, or infiltrating any of the abdominal viscera. The other pelvic organs were entirely normal.

The gross specimen consisted of a large, pale gray, solid tumor weighing 1050 Gm. The surface was rather smooth. Cut surface was opaque, grayish-white and firm, with scattered areas of hemorrhage and degeneration. Microscopically, no break through the tumor capsule was observed. The tumor consisted of irregular cords and nests of large, immature-appearing cells with round or polyhedral vesicular nuclei, showing frequently one large nucleolus. These large nuclei were surrounded by frequently granular, faintly pinkish-blue cytoplasm. In the more central portions of the tumor the stroma was minimal in amount, and was infiltrated with lymphocytes. Mitotic figures, many atypical, were present in large numbers.

The patient recovered uneventfully, and 18 months after surgery a complete check revealed no evidence of recurrence or metastasis. 3 figures.

(Custer's paper, unlike most others on the subject, does not minimize the always present malignant potentialities of dysgerminoma, though it is certainly far less malignant than the ordinary varieties of ovarian cancer, such as the common types of adenocarcinoma. On the other hand, I would not be inclined to put the incidence of recurrence and metastasis as high as 40 to 60 per cent. There are still too few follow-up studies on this point, but in one fairly large group of our own cases the recurrence rate was something like 25 per cent. It is on such points as this that the Ovarian Tumor Registry may yield valid information in future years, when a sufficiently large storehouse of well-authenticated cases has been accumulated and followed up.—Ed.)

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unsatisfactory because of an intact hymen. Rectal examination showed the true pelvis to be empty. The external genitals were of normal female type.

A celiotomy was performed and an almost solid lobulated mass the size of a child's head was found in the right lower abdomen. A considerable quantity of fibrous exudate was on its surface. In removing the mass from the abdomen a large cystic area was opened and a considerable quantity of serosanguineous fluid escaped into the abdominal cavity. There were adhesions between the tumor and the pelvic floor, and the entire pelvic floor was thickened. The left ovary was not present. A retroperitoneal mass was felt which probably represented a rudimentary uterus. The patient's postoperative course was uneventful.

The specimen consisted of an ovarian mass which measured 21 by 14 by 10½ cm. and was well encapsulated except for a perforation at one end. Centrally, there was a large degenerative cyst filled with necrotic material, blood clot and serous fluid. Microscopically, the tissue was very cellular, with scant interspersing fibrous tissue. The cells were large and were arranged in masses, nests and cords. The cytoplasm was clear, the nuclei large and vesicular. Numerous mitotic figures were seen. There were large areas of hemorrhagic infiltration and moderate lymphocytic infiltration into the sparse fibrous connective tissue. The diagnosis was dysgerminoma of the ovary, with marked degenerative change.

The patient was transferred to another hospital for deep x-ray therapy. About 4 months after operation she presented no complaints to indicate a recurrence of the tumor. 4 figures.

(See comment on preceding paper.—Ed.)

## LATE RESULTS IN THE RADIOLOGICAL TREATMENT OF SEMINOMAS

P. FLORENTIN, P. JACOB AND A. HUN

Bull. Ass. Franç. P. L'étude Du Cancer 33: 185-191, 1946

The authors report the results obtained in the treatment of seminoma of the testis and ovaries, by irradiation, at the "Centre Anticancereux de Lorraine," during the period 1927-1944, and make a comparative study of the radiosensitivity of these tumors in the male and in the female.

This report includes 28 cases of seminoma of the testis and only 5 of seminoma of the ovaries, all of which had a definite pathological diagnosis made. Of the 28 cases of testicular seminoma, 17 (67 per cent) died, 14 of which during the first year. These cases had multiple metastases to the abdomen, lungs, etc., and were operated upon in a very late stage. Operation was followed by irradiation in all cases. Eleven cases are still living, some of them after 7 years.

## DYSGERMINOMA OF THE OVARY

T. P. SCHOMAKER, H. W. GLASCOCK AND B. M. CHAPMAN

*San Francisco, Calif.*

Am. J. Obst. &amp; Gynec., 53: 520-524, 1947

The 2 cases of dysgerminoma of the ovary presented in this paper may be summarized as follows:

Case 1.—A 21 year old woman was admitted to the hospital with the chief complaint of constipation of  $2\frac{1}{2}$  months duration, amenorrhea of 2 months duration and a symptomless abdominal mass first noticed about 2 months previously. There had been increased urinary frequency and nocturia in the last few weeks. The patient had gained 10 pounds in the month prior to admission.

Examination revealed that secondary sex characteristics were entirely normal. There was a midline abdominal mass which appeared to arise from the pelvis, was smooth, movable, nontender, and gave the impression of being cystic. The cervix was soft, congested and slightly purple in color. A large mass was palpated in the cul-de-sac. A diagnosis of large ovarian cyst and a 3 months' pregnancy was made.

X-ray studies of the abdomen revealed a large soft tissue mass arising from the right pelvis. The Friedman test was positive on 2 occasions.

Exploratory laparotomy revealed the uterus to be enlarged to the size of a  $3\frac{1}{2}$  months' pregnancy. A large, freely movable nodular mass was attached to the right broad ligament by a definite pedicle. It was removed intact after ligating the pedicle. Further abdominal exploration was unrevealing. Recovery was uneventful; radiation therapy was deemed inadvisable.

The ovarian specimen was entirely capsulated and measured 19 by 13 by 11 cm. The mass seemed to be composed of solid tissue with small scattered cystic areas throughout and hemorrhagic extravasation in some areas. Microscopically, this tissue was composed of nests, masses and cords of large cells with granular and vesicular nuclei and a clear cytoplasm. Numerous mitotic figures were present. Tumor giant cells were seen. The fibrous tissue was moderately infiltrated with lymphocytes. The diagnosis was ovarian dysgerminoma.

The patient delivered without complication. Examination approximately 2 years after operation revealed no evidence of recurrence or metastasis.

Case 2.—A 22 year old woman was admitted with the chief complaint of soreness and tenderness in the right lower quadrant, abdominal mass in that area and moderate constipation. The menstrual periods were regular every 28 days; the last menstrual period had occurred 31 days prior to admission. Her symptoms had been noticed after the patient bumped her abdomen against the framework of a truck 2 weeks previously.

The body build was definitely masculine; hirsutism was normal female in type. A mass filled the right lower portion of the abdomen. Pelvic examination was



with severe stress incontinence of 3 months' duration. A mass was now found rising out of the pelvis, which was thought to be probably a fibroid uterus.

Vaginal hysterectomy revealed a solid ovarian tumor attached to the right lateral wall. Following the vaginal hysterectomy and posterior colpo-perineorrhaphy, the abdomen was opened. The right ovary was replaced by a fungating mass which had spread laterally to the pelvic wall. Bilateral salpingo-oophorectomy was performed. Another neoplasm was found involving the terminal ileum. This was resected and an ileo-transverse anastomosis performed. Recovery was uneventful, and at 2 years and 3 months after operation the patient is in excellent health with no evidence of recurrence.

The histological appearance of the right ovary, of the left ovary also, and of the deposit in the terminal ileum was identical. From the histological features and the way the tumor had spread, a diagnosis was made of granulosa-cell carcinoma.

The author concludes that the general impression that granulosa-cell tumors are, in the main, benign, or at most, only locally malignant, would appear to be too optimistic. As it appears likely that there are grades of malignancy in granulosa-cell carcinomas, their radical removal is advised even where the prognosis may seem clinically hopeless.

(We still have very inadequate knowledge as to the degree of malignancy and the recurrence rate of granulosa cell tumors, and I am inclined to agree with the author that most pathologists take them a little too lightly. While it is certainly true that as a group they are far less malignant than are the ordinary types of primary ovarian cancer, a great many cases have been observed in which, as with Hawksworth's case, rapid recurrence, metastasis and death have followed even complete removal of the pelvic organs. Thus far it has not been possible to correlate such clinical malignancy with the histological characteristics of the tumor, although this question has as yet not been studied as thoroughly as it should be. It is hoped that the study and follow-up of the rapidly growing number of granulosa cell tumors in our Ovarian Tumor Registry will throw light on this problem. A good many years ago, at the International Congress of Cancer in Atlantic City, one of the best pathologists in the country, in the discussion of a paper which I had presented on the subject, inquired why the term granulosa cell carcinoma should be used instead of granulosa cell tumor, since, as he put it, all these tumors are essentially benign. I am sure he has changed his viewpoint by now, if he has had the opportunity of studying any large number of cases. He probably has, because more and more cases are reported as pathologists are becoming familiar with its histological characteristics, and it can scarcely now be considered a rare tumor.—Ed.)

## GRANULOSA CELL TUMORS OF THE OVARY

LICINIO H. DUTRA

*Rev. de Ginec. e d'Obst. (Brazil)*, 61: No. 1, January 1947

A 46-year-old patient complained of irregular menstrual periods and menorrhagia for the past 9 months, and severe cough for the past 2 months, accompanied

Of the 5 cases of ovarian seminoma, on the contrary, only 1 died after 5 months (girl 10 years old who already had many abdominal metastases at laparotomy). The remaining 4 cases are still well, 1 even after 15 years. Their ages were 22, 22, 15, 15 and 10 years old, in contrast to the average 48 years in the male.

The results achieved with surgery plus irradiation in the treatment of seminomas were, therefore, far much better in the cases of seminoma of the ovaries than in the cases of testicular seminomas. Other authors have reported similar results. Prognosis of ovarian seminoma is much more favorable and, moreover, the activity of x-ray seems to be more constant in the female than in the male. Perhaps the ovaries possess a lower power for producing metastases.

Irradiation is done by using 2,500 R. per field in a dose of 250 R. per session, under 200 KV. Whenever there are multiple metastases present, a total dosis of 3,000 R. per field is used, divided into 150 R. per session.

The best results are of course obtained in those cases sent in soon after operation, so that irradiation might prevent the occurrence of metastases.

(Dysgerminoma of the ovary and seminoma of the testis are indistinguishable histologically, and they have exactly the same histogenesis. Both are derived from segregated cells dating back to the early undifferentiated phase of gonadal development. It is of interest, therefore, that the male tumor, the seminoma, possesses a much higher degree of clinical malignancy than does the corresponding tumor in the female, and that it has a much lower degree of radiosensitivity. On the latter point there has been a difference of opinion in the few published reports in which this has been discussed. The proportion of cases of dysgerminoma subjected to radiotherapy has been rather small, probably because most of the patients have been young, and radiotherapy would involve the undesirable hazard of sterilization. Moreover, conservative unilateral removal of the adnexa has been followed by cure in a large proportion, without the necessity of postoperative radiation. In the larger growths which have broken through their capsules and become infiltrative, radiotherapy is indicated. The very first case observed in our clinic was a child of 7, with a huge infiltrative dysgerminoma which filled most of the abdomen and which could not be completely removed. Postoperative radiation brought about rapid shrinkage of the residual growth, but only temporarily. The radiotherapy was repeated several times, with always temporary improvement, though a residuum of growth always remained, with ultimate death about 3 years after operation.—Ed.)

## MALIGNANT GRANULOSA-CELL TUMOUR

W. HAWKSWORTH

Proc. Roy. Soc. Med., 39: 580-581, 1946

The patient, aged 38, was first seen complaining of a constant desire to open the bowels for the past 6 months. Actually she moved them 2 to 3 times daily. She had slight hypogastric pain the first day of her menstrual periods. Nothing significant was noted on examination. Sixteen months later she reported again

## PRECOCIOUS PUBERTY DUE TO GRANULOSA CELL TUMOR

DUPERRAT, GUNY AND AUCLAIR

Bull. Ass. Franç. P. L'étude du Cancer: 33: 152-156, 1946

The authors report a case of granulosa cell tumor in a child 5 years old, who had been having vaginal bleeding for a few months. At the same time, the abdomen became gradually distended, the breasts developed, but no hair growth was noted in the pubis nor in the axillary region, nor changes had occurred in the vulva. Psyche remained unchanged. On examination, a tumor was felt in the pelvic cavity reaching the level of the umbilicus. On laparotomy, a tumor the size of a melon was located on the right ovary. Right oophorectomy was performed followed by uneventful recovery. On the day following operation, patient had metrorrhagia for 3 days, which, according to Varangot, is due to a sudden drop in the level of estrogen in the blood stream. Patient was seen again 3 months later, in good condition, with the breasts retrogressed and with no further complaint of vaginal bleeding. Pathologically, the tumor was polycystic, a granulosa cell tumor of the folliculoid type. No areas of luteinization were observed.

(The clinical history of this patient is quite typical, except for the fact that precocious puberty was not accompanied, as it almost always is, by the appearance of axillary and genital hair. This is probably explained by the fact that the history was of short duration, only a few months. Even with normal puberty, the secondary sex characteristics do not always appear in the same order. For example, the breasts may become increasingly prominent many months before the appearance of the first flow, but sometimes only shortly before. There is the same variation as regards breast growth and the appearance of axillary and genital hair. On the other hand, it is rather strange that a growth the size of a melon had not produced pubertal phenomena long before it did. Perhaps the tumor was only partly of granulosal character.—Ed.)

ADRENAL-LIKE MASCULINIZING TUMOR OF THE OVARY  
ASSOCIATED WITH BLEEDING FIBROMYOMA UTERI

G. A. WILLIAMS AND W. A. MENDENHALL

*Chamblee, Ga.**Crawford W. Long Memorial Hospital*

Am. J. Obst. &amp; Gynec., 53: 525-528, 1947

In 1944 Kepler, Dockerty and Priestly collected 13 cases of adrenal tumors of the ovary from the literature and added one of their own. Since then 4 additional cases have been reported. The patients' ages varied from 15 to 62 years, and all had amenorrhea. The case reported in this paper is the only one in the

by considerable loss of weight (15 kg.). On pelvic examination a large solid tumor which seemed to be attached to the body of the uterus was felt. With the impression of myoma of the uterus, laparotomy was performed. Both ovaries were occupied by tumors, the one on the left the size of a fetal head and the one on the right the size of a pear. Uterus was slightly enlarged and retrodisplaced by both ovarian tumors. Simple bilateral salpingo-oophorectomy was performed, with conservation of the uterus, since the condition of the patient did not allow a bigger procedure, nor did it really seem necessary to remove the latter. Histopathological examination of the specimens revealed a bilateral granulosa cell tumor of the ovary, of the mixed type (folliculoid and cylindromatous). In view of this diagnosis, biopsy of the endometrium was performed on the 7th post-operative day, and this showed cystic glandular hyperplasia of the endometrium with some areas of squamous metaplasia and parietal mixed endometrial endometriosis (Goodall). These findings are interpreted by the author as due to the abnormally high amounts of estrogenic hormone secreted by the ovarian neoplasms. Since metaplasia leads into anaplasia, this case seems to reflect the so-called carcinogenetic effect of estrogens. As a matter of fact, in a previous study made on polyps of the uterine cervix, the author finally arrived at the conclusion that epidermidization when associated with irritant or metaplasia factors, definitely constitutes a precancerous condition.

X-ray studies of the lungs showed definite metastases and the patient finally died 45 days after the operation. This case constitutes the 14th granulosa cell tumor reported in the Brazilian literature, 6 of which were malignant, 2 benign and the remaining ones with no follow-up studies.

The author emphasizes the incidence of malignancy in the cases reported in Brazil (proportion of 6:2), in spite of the fact that the clinical course of these neoplasms is usually claimed to be benign. On the other hand, of the 7 cases of arrhenoblastoma reported in the Brazilian literature, only 1 proved to be malignant (malignancy proportion of 1:7).

(This case illustrates again the fact that granulosa cell tumors are considerably more wicked than many authors seem to believe, although no large number of follow-up studies of large series have as yet been reported, so that accurate figures as to the incidence of recurrence and malignancy are not yet possible. The recurrence rate is certainly not as high as the 75 per cent seen in the Brazilian cases, but it must be remembered that recurrence may not take place for a great many years, as much as 18 in one reported case (Compton). Sometimes, however, it occurs with amazing rapidity, as in Dutra's case. With such a bilateral tumor as he describes, panhysterectomy, with bilateral oophorectomy, should be done if possible, as it apparently was not in Dutra's case.)

As the author states, hyperplasia of the endometrium is often associated with these estrogen-producing tumors. It may be of the common Swiss-cheese variety, but at times it is of atypical, proliferative type, so that it may readily be mistaken for adenocarcinoma. This error has obviously been made in at least some of the reported cases of this association of lesions. On the other hand, unquestioned carcinoma may occur in the endometrium, confirming the impression held by some of us that in postmenopausal women, as most of these patients are, persistent estrogen stimulation of the endometrium may at least predispose to the development of endometrial adenocarcinoma.—Ed.)

noted, the picture sometimes strongly resembling the typical Cushing syndrome. All of which emphasizes how little we as yet know concerning the mechanism of sex differentiation, and especially how little we know as to the nature of the functional relationship between the adrenal cortex and the ovary, and between both these glands and the pituitary.—Ed.)

## MASCULINIZING TUMOR OF THE OVARY OF THE ADRENAL TYPE

M. DOUGLASS

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*Western Reserve University School of Medicine and  
Lakeside Hospital*

Am. J. Obst. & Gynec., 53: 190-198, 1947

The author discusses the various opinions set forth by different writers as to the identity of masculinizing tumors of the ovary. Karsner believes it probable that the male characteristics are due to the male sex hormone. However, in cases of undoubted masculinization the demonstration of excreted androgens in increased amounts has not been constant. Schiller's observation of 2 cases of adrenal-like testicular tumors associated with feminization in the male tend to confirm the Bauer hypothesis that adrenal tumors tend to masculinize the female and feminize the male, i.e., support the characters of the opposite sex.

A case is presented which occurred in a woman following the menopause who showed marked changes of masculinization. Following extirpation of the tumor, there was reversion to the bodily habitus of the normal postmenopausal woman.

The patient was a 48-year-old white woman, para iii, who complained of pain in the back and both lower quadrants which had begun 7 years previously. During the past 2 years there had been loss of much scalp hair, general hypertrichosis of chest, body and legs, and a change in facies. The menopause had occurred at 37 years of age, with cessation of bleeding. The voice had become deep and the patient was compelled to shave her face daily. There had been loss of libido for the past 6 years.

The patient was well-developed, well-nourished, and had masculine facial features. The chest was of large male type, the breasts small, soft and rather atrophic with flat nipples. There was a marked overgrowth of hair on the face, chest, abdomen and lower extremities. There was an area of baldness and the scalp hair was thin and receded at the temporal regions. The voice was basso. The patient's blood pressure was 150/90. The blood sugar was normal. Polycythemia was present. Pelvic examination revealed the fundus to be large, smooth and somewhat limited in mobility. The adnexa seemed enlarged, with a palpable tumor on the right. There was definite marked hypertrophy of the clitoris and masculine type pubic hair distribution.

literature which was associated with vaginal bleeding of any kind, this bleeding being due to fibromyoma uteri compressing atrophic endometrium.

The patient, aged 54 years, was admitted to the hospital with the chief complaint of irregular vaginal bleeding of 36 months' duration. Seven months prior to admission she began to grow hair on the lips, chin, cheeks, chest and extremities, and her voice became husky.

The patient was obese with a blood pressure of 180/100. There was acne of the face, chest and shoulders. An irregular, firm, painless tumor occupied the suprapubic region. The clitoris was enlarged and quite erectile. The mucosa of the vestibule and vagina was atrophic. The corpus uteri was enlarged to about the size of a 10 weeks' pregnancy. Urinalysis showed a trace of albumin and sugar and an occasional hyaline cast. The impression was fibromyomatous uterus and virilism with acne and hypertension which suggested extragenital origin. Total hysterectomy was decided upon.

Laparotomy revealed a solid tumor of the left ovary, about 4 by 3 by 4 cm. The right ovary and both tubes were normal. Total hysterectomy and bilateral salpingo-oophorectomy were performed.

The uterus contained several fibromyomas, one of which compressed the uterine mucosa. The endometrium was atrophic with an area of organized hemorrhage where it was compressed by the tumor. The right ovary was very sclerotic. The left ovary had a smooth capsule, and cut surface showed a solid mass of brilliant orange-colored, moderately firm tissue without necrosis or hemorrhage. Microscopically, the left ovary showed only a narrow covering layer of identifiable ovarian tissue. The bulk of the mass was composed of a broad sheet of large, faintly granular, lipoid type of cells with very little supporting connecting tissue, but with numerous blood vessels. In a few places some cells were smaller with more opaque and granular cytoplasm. There was an occasional small area of hemorrhage, but no necrosis. No giant cells were seen. The pathologic diagnosis was: adrenal tumor of ovary; multiple fibromyoma of the uterus with infarction of atrophic endometrium.

At 12 weeks postoperatively, the patient had lost 22 pounds, the blood pressure was 140/83, and the urine was normal. The voice was slightly improved, the hirsutism much improved and the acne had entirely disappeared. The clitoris was slightly smaller. 1 figure.

(In some cases of this general group, the histological characteristics appear to leave no doubt as to the adrenal nature of the growth, and this would seem to apply to the case reported above. In others there is considerable doubt, and the rather large, clear, lipoid cells have in some cases been interpreted as of lutein type, and the tumors designated as masculinizing luteomas, though this interpretation is open to serious question. Various other viewpoints have been suggested, many of which are well reviewed in the recent paper of Iverson (Surg., Gynec. & Obst., 84: 213, 1947). The term masculinovoblastoma, suggested by Rottino and McGrath for the more obscure cases of this general group, is convenient as a dumping-ground for such cases, but it is otherwise an undesirable one.

While adrenal ovarian tumors produce a masculinizing syndrome similar to that caused by arrhenoblastoma, there are occasional departures from the usual picture in the case of both these neoplasms. In some cases adiposity, hypertension and glycosuria have been

(An interesting feature of this case is that the masculinizing tumor developed in a post-menopausal woman, so that the defeminizing early symptoms of such tumors, especially amenorrhea and breast regression, were not noted. Furthermore, as the author remarks, a slight masculinizing tendency may at times be noted in the normal menopausal woman, possibly due to the effects of androgenic adrenal principles previously inhibited by ovarian activity. In at least some of the reported cases of both adrenal ovarian tumor and arrhenoblastoma there has been a departure from the simple masculinization pattern in that such symptoms as hypertension, glycosuria, polyuria and obesity have also been present, with at times a good simulation of the Cushing syndrome, as mentioned in the comment on the preceding abstract. We know too little about the nature of the relations of the adrenal cortex and the gonads, and of the adrenal and hypophysis, certainly not limited to the adrenotrophic hormone of the latter, to speculate intelligently about these varying clinical manifestations.—Ed.)

## A CASE OF STRUMA OVARIII

A. TAILHEFER AND M. GUERIN

Bull. Ass. Franc. P. L'étude du Cancer, 33: 131-140, 1946

A 60-year-old patient, in menopause for 11 years, had become nervous and noted gradual distention of the abdomen for the past 3 years. At laparotomy, a cystic tumor was encountered on the right ovary, which was removed. Pathological examination revealed the pattern of a typical goiter, even though the picture was very polymorphous, showing large and small vesicles filled with colloid material. It was a pure type of ovarian goiter, as only thyroid tissue was present in the tumor; no other teratoid element was observed. Though the patient complained of nervous symptoms, this neoplasm did not seem to be accompanied by symptoms of hyperthyroidism, since no general epithelial hyperplasia with colloid metachromasie, nor islands of eosinophyl cells could be observed. Patient was seen again 5 years later, in very good health.

As to the histogenesis, it seems that struma ovarii ought to be considered as a tumor constituted of real thyroid tissue, and not be looked upon as an epithelial ovarian tumor (cystadenoma or granulosa cell tumor) plus secondary special colloid vesicular degeneration. The following evidence tends to demonstrate that this type of tumor is due to a late evolution of a blastomeric inclusion pertaining to the first stages of embryonic development:

- 1) Embryologically, this tumor frequently co-exists with teratoid elements (teeth, nervous tissue, etc.);
- 2) Morphologically, in those cases presenting a polymorphous picture as in the one reported in this paper, no pattern suggestive of cystadenoma or granulosa cell tumor is encountered;
- 3) Histo-chemically, the presence of mucincarmineophile, which is a characteristic finding in mucoid cystic tumors, is, on the other hand, absent in struma ovarii. Colloid substance can be stained and iodine can be demonstrated in some cases;
- 4) Physiologically, in at least a few cases, struma ovarii exhibits endocrine activity, though usually this is not the case.

At operation, the uterus was found to be enlarged, congested and deep red in color, not at all the small atrophic senile uterus of a woman 10 years past the menopause. No myomas were present. The left ovary was somewhat enlarged, and the right ovary was definitely hypertrophied, being about 4 cm. in its largest diameter. It was distinctly hard. Both ovaries were globular, light yellow in color, but presenting no discrete tumor. Their surfaces were smooth, showing no evidences of postmenopausal atrophy. No adhesions were present. The kidneys and adrenals were normal to palpation. Bilateral salpingo-oophorectomy and subtotal hysterectomy were performed.

The external surface of the right ovary was pinkish gray, corrugated and, in one region, elevated. Near the center of the ovary there was a tumor mass which measured 1.4 by 1.2 by 0.8 cm. This tumor mass was light brown, firm and fleshy, and on its cut surface there were multiple small red foci. The tumor was sharply demarcated from the surrounding tissue on one edge and blended with the adjoining tissue on the opposite. Sections of the right ovary showed considerable normal ovarian stroma and many small arteries showing intimal and medial thickening and hyalinization. The tumor was not encapsulated. Its cells were large and were mostly cuboidal or polyhedral in outline. They had pink granular cytoplasm and large round or oval nuclei that were moderately chromatic. The tumor cells were present in irregular sheets and groups, and in general, simulated those ordinarily seen in adrenal cortex. No bizarre nuclear forms or abnormal mitotic figures were seen. There were numerous very small droplets of lipoidal material in the cytoplasm of many tumor cells.

Follow-up of this patient over a period of 2 years has shown complete restitution of normal female facies and habitus, with scalp hair normally abundant and covering the entire crown. Facial hair still requires shaving every third or fourth day, but this is not incompatible with the postmenopausal tendency to general hirsutism. Body hair has completely disappeared, except for the normal female pattern of pubic hair distribution. The clitoris is normal in size and appearance.

The excretion of 17-ketosteroids in the urine before operation was 11.6 mg. in 24 hours, and the androgen excretion as determined by bioassay was 33 international units. These values were within the normal range for adult females. Within the first postoperative week, values ranged from 3.4 to 6.5 mg. Two months postoperatively the excretion had risen to 8.5 mg.

Before operation the urinary gonadotrophic hormone output was less than 4 mouse uterine units per day. This low value is in interesting contrast with a high level of 64 units obtained 2 months postoperatively. It is concluded that, in spite of the functional behavior of the tumor in terms of 17-ketosteroids and bioassay in international units, its demonstrable output of androgens was extremely low in comparison with other reported cases, suggesting either that androgens in large amounts are not necessary to produce masculinization, or that the means of measuring them quantitatively are as yet not sufficiently refined as to be entirely reliable. 10 figures.



(An interesting feature of this case is that the masculinizing tumor developed in a post-menopausal woman, so that the defeminizing early symptoms of such tumors, especially amenorrhea and breast regression, were not noted. Furthermore, as the author remarks, a slight masculinizing tendency may at times be noted in the normal menopausal woman, possibly due to the effects of androgenic adrenal principles previously inhibited by ovarian activity. In at least some of the reported cases of both adrenal ovarian tumor and arrhenoblastoma there has been a departure from the simple masculinization pattern in that such symptoms as hypertension, glycosuria, polyuria and obesity have also been present, with at times a good simulation of the Cushing syndrome, as mentioned in the comment on the preceding abstract. We know too little about the nature of the relations of the adrenal cortex and the gonads, and of the adrenal and hypophysis, certainly not limited to the adrenotropic hormone of the latter, to speculate intelligently about these varying clinical manifestations.—Ed.)

## A CASE OF STRUMA OVARII

A. TAILHEFER AND M. GUERIN

Bull. Ass. Franc. P. L'étude du Cancer, 33: 131-140, 1946

A 60-year-old patient, in menopause for 11 years, had become nervous and noted gradual distention of the abdomen for the past 3 years. At laparotomy, a cystic tumor was encountered on the right ovary, which was removed. Pathological examination revealed the pattern of a typical goiter, even though the picture was very polymorphous, showing large and small vesicles filled with colloid material. It was a pure type of ovarian goiter, as only thyroid tissue was present in the tumor; no other teratoid element was observed. Though the patient complained of nervous symptoms, this neoplasm did not seem to be accompanied by symptoms of hyperthyroidism, since no general epithelial hyperplasia with colloid metachromasia, nor islands of eosinophil cells could be observed. Patient was seen again 5 years later, in very good health.

As to the histogenesis, it seems that struma ovarii ought to be considered as a tumor constituted of real thyroid tissue, and not be looked upon as an epithelial ovarian tumor (cystadenoma or granulosa cell tumor) plus secondary special colloid vesicular degeneration. The following evidence tends to demonstrate that this type of tumor is due to a late evolution of a blastomeric inclusion pertaining to the first stages of embryonic development:

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- 3) Histo-chemically, the presence of mucincarmineophile, which is a characteristic finding in mucoid cystic tumors, is, on the other hand, absent in struma ovarii. Colloid substance can be stained and iodine can be demonstrated in some cases;
- 4) Physiologically, in at least a few cases, struma ovarii exhibits endocrine activity, though usually this is not the case.

(In this case the entire ovarian tumor was composed of thyroid tissue, while in other instances only a considerable portion represents thyroid, the remainder of the tumor showing teratomatous elements of one sort or another. The designation of struma is employed for both groups, though it would scarcely be applicable to teratomas which show only a very small amount of thyroid, perhaps only of microscopic size. While this would seem to be a sensible limitation of the term, no hard and fast rule has been established on this point. As the authors discuss, the teratomatous origin of struma ovarii is based on good evidence and is universally accepted. As they further state, in only a small proportion of the cases does the ovarian thyroid tissue become hyperactive, with the production of clinical hyperthyroidism, although a rather considerable group of such cases has been reported.—Ed.)

## MEIGS' SYNDROME IN THECA-CELL TUMOR OF THE OVARY

L. E. FRANKENTHAL, JR.

*Chicago, Ill.*

*Am. J. Obst. & Gynec.*, 53: 331, 1947

A white woman, aged 44 years, was admitted to the chest service of the Michael Reese Hospital complaining of dyspnea of 2 months' duration and the presence of an abdominal tumor for the same period of time. Hysterectomy had been performed 8 years previously.

A total of 4,930 cc. of clear fluid was removed from the right pleural cavity over a period of 10 days. Gynecologic consultation revealed a grapefruit-size mass in the left lower quadrant. A diagnosis of fibroma of the left ovary with hydrothorax (Meigs' syndrome) was made and the patient was subjected to laparotomy. There were moderate ascites, multiple adhesions and a large tumor of the left ovary which appeared grossly malignant. Both tubes, ovaries and the remaining portion of the uterus were removed, and the patient recovered. The pathologic diagnosis was theca-cell tumor of the left ovary with degenerative changes and multiple simple cysts.

(This interesting syndrome, including both ascites and hydrothorax, was originally described as occurring with fibroma of the ovary, but it appears to be possible with almost any type of solid tumor of the ovary, having been observed in cases not only of fibroma, but also with Brenner tumor, thecoma and carcinoma, the latter in the absence of any metastases to the pleura. Why it occurs in a small proportion of such tumors and not in others that may be larger and heavier is not clear. As a matter of fact, there is as yet no exact knowledge of the mechanism involved, especially as regards the hydrothorax.—Ed.)

OVARIAN ADENOACANTHOMA ASSOCIATED WITH  
ENDOMETRIOSIS OF THE OVARY

J. F. KUZMA

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Kenosha, Wisconsin; and Milwaukee Hospital*

Am. J. Obst. and Gynec., 53: 245-251, 1947

Two cases of adenoacanthoma of the ovary are reported, which occurred in women who had clinical symptoms and pathological findings of endometriosis of the ovaries. The association of the endometriosis and the adenoacanthoma is so intimate as to suggest a definite causal relationship.

The first patient, aged 42 years, para iii, presented herself with the chief complaints of pelvic pain, tenderness and a feeling of weight and fullness in the pelvis for 22 years, beginning as mild intermittent discomfort. Menstrual history was normal, except for dysmenorrhea. The essential findings on physical examination were a scarred cervix, normal sized and normal positioned uterus, and fullness and resistance in the right adnexal area. At laparotomy a subtotal hysterectomy, bilateral salpingo-oophorectomy and appendectomy were performed.

Grossly, the endometrium was 8 mm. in thickness, soft, pale, moist and glistening. Tubes and ovaries were covered by fibrous adhesions. The right ovary had a granular scarred surface. On section, glistening white finely granular lobulated nodular tissue was found. One part of the nodule contained yellowish granular material. The left ovary had a central hemorrhagic cyst, outlined by brownish granular material firmly attached to a granular internal surface.

Microscopically, the endometrium showed edematous swelling with pale spongy type of stromal tissue. The glands were long and showed subnuclear vacuolization. Minute foci of lymphocytic cells were present. The myometrium showed no particular change. The left ovary presented rather prominent granular pigmentation contained in macrophages. The cystic area was outlined by columnar epithelium and columnar glands. This epithelium was accompanied by spongy round cell and stellate cell endometrial stromal tissue, in which free red blood cells were found. The right ovary also showed some granular brownish pigment present in macrophages, but the main portion showed a glandular formation which was characterized by large irregular tortuous columnar glands. Portions of the glands in some instances were outlined by a squamous type of epithelium which continued between the glands, forming nests and whorl-like structures. The squamous epithelium was followed as a process of metaplasia. The diagnosis was: glandular hyperplasia of endometrium, ovarian endometriosis and adenoacanthoma of right ovary.

The second patient, aged 36 years, entered the hospital with complaints of abdominal tenderness, backaches, menorrhagia, constipation, dysmenorrhea and leucorrhea. Pelvic examination was attended by pain and the finding of

bilateral cystic ovaries and a normal sized uterus. Bilateral salpingo-oophorectomy, total hysterectomy and appendectomy were done. At operation extensive endometriosis of the left ovary, cul-de-sac and rectosigmoid, cyst of the left ovary and fibroid of the uterus were found.

Grossly, the uterus contained a white nodule composed of whorls. The endometrium was thickened and polypoid in character. The right ovary contained a hemorrhagic corpus luteum cyst and a follicular cyst. The left ovary was a glistening cyst, which, when opened, contained a brownish cloudy fluid. The internal cyst wall was for the most part covered by pasty brownish material; in one area there was a papillary soft pink growth. The cyst wall also contained flattened cysts filled with a pasty chocolate material.

Microscopically, the cyst wall of the left ovary had an internal lining of pigment laden macrophages. The papillary formation visible grossly was a glandular papillary formation composed of tall columnar glands. Some glands were partially outlined by columnar epithelium with the appearance of squamous cells. This formed whorls and sheaths between the glands. These cells showed reddish granular keratin formation. Mitoses were present. The cyst wall distant from the papillary formation consisted of tall columnar cells, areas of which showed complete metaplasia into squamous epithelium. The right ovary presented surface adhesions in which there were many dilated vascular channels; a few histiocytes and lymphocytes could be seen in the adhesions. This ovary had foci of pigment laden macrophages. The surface of the tube presented a glandular structure outlined by tall columnar epithelium and some peripheral swollen elongated cells. The endometrium showed general glandular hyperplasia. In many places the stroma was edematous and partly hemorrhagic. In two small particles of endometrium the glands were closely spaced, and here were evident minute foci of metaplasia in which there was squamous type of epithelium. The diagnosis was: polypoid glandular hyperplasia of endometrium showing a microscopic focus of adenocarcinoma; endometriosis of tube; papillary cyst adenocarcinoma of left ovary, fibroleiomyoma; old hemorrhagic cysts of ovary, probably endometriosis.

It is suggested that ovarian endometriosis may become a malignant neoplasm. That the development of adenocarcinoma is associated with ovarian endometriosis is unquestionable in the first case from the standpoint of gross and histologic findings. In the second case the histology is not nearly as convincing, but the old brownish pigmentation and small chocolate cyst areas can be interpreted as inactive endometriosis. In the 2 cases reported, the author considers that the development of squamous cells is a process of metaplasia. 4 figures.

Very early in his epoch-making work on endometriosis Sampson suggested the possibility that at least some cases of ovarian adenocarcinoma may have their source in ovarian endometriosis. In 1925 (*Am. J. Obst. & Gynec.*, 1: 10, 1925) he described a group of cases in which he suggested the probability of this sequence. In at least one the evidence for this seemed unimpeachable, while others were to be considered highly probable or possible. A number of subsequent writers have spoken of the possibility that adenocarcinoma of the ovary might arise from aberrant endometrium in the ovary, but only in a few instances does the evidence for this seem unquestionable.

A case of this sort came under my own observation, and is to be published in the Journal of the Mt. Sinai Hospital in the near future (Rubin Testimonial Number). In this case the malignant growth is seen to spring directly from the wall of a typical endometrial cyst. Furthermore, the growth is an adenoacanthoma, a variety rarely seen in ordinary ovarian carcinoma, but relatively common in the endometrium.

Another reported case has come to my attention recently. It was described by Gunnar Teilum in *Acta Obst. et Gynec. Scandinavica* 25: 377, 1945, and the evidence for the origin of the adenocarcinoma from an endometrial cyst seems clearly established. The same thing applies to at least the first of the 2 cases reported by Kuzma, this incidentally being an adenoacanthoma, as in my own case. The second case, as the author himself states, is not as convincing, though the endometrial origin of the carcinoma is at least probable.

The fact that even a small group of unimpeachable cases have been observed justifies the suspicion that this method of origin of ovarian carcinoma may not be rare since in the full-blown and perhaps advanced adenocarcinoma one could hardly expect to find any vestige of the ovarian endometrium from which such a cancer might arise. Furthermore, there are certain types of ovarian carcinoma in which the microscopic pattern of the growth is very remindful of uterine adenocarcinoma, although this in itself would be a very precarious criterion as to the histogenesis of such tumors.—Ed.)

## CONSERVATIVE TREATMENT AND THERAPEUTIC TEST FOR ENDOMETRIOSIS BY ANDROGENS

J. C. HIRST

*Philadelphia, Pa.*

*Am. J. Obst. & Gynec.*, 53: 483-487, 1947

Although androgen will not cure "external" endometriosis, exerts relatively little regressive effect upon hard infiltrates or fused masses, has but temporary action and may induce arrhenomimetic symptoms, the clinical experience described in this paper indicates certain usefulness of androgen therapy for endometriosis. In relation to endometriosis, androgen has both negative and positive values. It will not reactivate the disease after the menopause, and will not cause regression of cystic ovaries associated with peri-oophoritis and excessive bleeding. The author has not seen regression of inflammatory residues as a result of androgen therapy. These last 2 negative observations are suggested as diagnostic possibilities. The positive values of androgen, particularly in rapid reduction of pain, tenderness and swelling of grossly cystic ovarian endometriosis are described in 19 brief reports of advanced cases of "external" endometriosis.

The author's method of administration has consisted mainly of 150 to 225 mg. of testosterone propionate in oil injected intramuscularly over a period of 2 to 3 weeks, followed by 10 mg. daily of oral methyl testosterone for variable periods up to 3 or more years. Aside from slight virilism and occasional acne, reactions have been negligible.

Two of the 19 cases reported in this paper illustrate the diagnostic possibilities of androgen. In one case suspected large bowel endometriosis was disproved

because bowel pain persisted after testosterone therapy; the condition proved to be proctitis. Twelve of the 19 cases were given conservative treatment with androgen. Frequently, relief of symptoms and regression or stasis of endometriosis were noted. The author believes that preoperative treatment with androgen in one case was useful, and describes 4 cases in which it was used post-operatively with good results.

(While there are some who believe that the endocrines are in some way concerned with the etiology of endometriosis, this has certainly never been established. On the other hand, no one will dispute the fact that ectopic pelvic endometrium, like the normal uterine mucosa, is influenced by various hormones, such as estrogen or testosterone. The latter has an effect which in the main appears to be anti-estrogenic, and this effect is made use of in the treatment by this androgenic hormone of certain cases of functional bleeding.

However, endometriosis is not characteristically associated with excessive bleeding, though one sees many cases in which an ovarian dysfunction is associated, and in which functional bleeding does occur. Testosterone may be helpful for this type of bleeding. But Hirst, in his paper, urges as its chief value the reduction of pain, and this indication, it seems to me, is of very limited value. In those cases in which the dysmenorrhea is very severe, the endometriosis is usually quite extensive, often with unilateral or bilateral endometrial cysts, and not infrequently with uterosacral deposits or nodules. One would hardly wish to keep treating such patients month after month, and perhaps year after year, with testosterone, even if it always kept them comfortable, which I seriously doubt would always be the case. The sensible plan with such patients is surgical treatment.

In the milder forms of endometriosis, menstrual pain is not by any means constant or always severe, and I for one would rather make such patients comfortable by simple analgesics, such as codein and aspirin, than to subject them to long drawn out organotherapy, whether hypodermic or oral.

In this connection, it seems to me that there is a tendency on the part of gynecologists to assume the existence of endometriosis in many cases of "acquired" dysmenorrhea even if there is no palpable adnexal disease, and operations are even done on such assumptions. I am sure that in a large proportion of such cases no endometriosis is found. While pre-operative diagnosis is possible in only a certain proportion of cases, and chiefly in those where there is involvement of the uterosacral ligaments, one would hesitate to operate on the completely negative pelvis, in which it is likely that such symptoms as dysmenorrhea are due to something other than endometriosis. Operations in such cases are apt to be unsatisfactory, at least diagnostically, and one is apt to end up with something like a presacral neurectomy alone.

On the other hand, when one feels a tender, enlarged, fixed ovary, either with or without uterosacral nodules, there may be uncertainty as to whether one is dealing with an endometriosis or a pelvic inflammatory lesion. However, there is definite pathology, and if the patient's symptoms are sufficiently severe to necessitate operation, the results of the latter are apt to be satisfying to both the patient and the surgeon.

There are of course certain exceptions, but in the main one should hesitate about operating for the symptom of pain, so often subjective, in the absence of any palpable abnormality of the pelvic organs. This generalization does not apply to the typical primary dysmenorrhea, in which, when simpler and safer measures fail, presacral neurectomy is a perfectly proper procedure.—Ed.)

## ENDOMETRIOSIS: ITS RECOGNITION AND CLINICAL DIAGNOSIS

E. E. BLECK

Marquette M. Rev., 12: 117-122, 1947

The author concludes that a clinical diagnosis of endometriosis can be made in most instances if the following triad consisting of a symptom, a sign and a special susceptibility be kept in mind: (1) increasing dysmenorrhea; (2) palpable hard, fixed tender nodules in the cul-de-sac or the uterosacral ligaments (best palpated during or just preceding the menstrual period); and (3) special susceptibility, limited to that group of women, married or single, in active menstrual life, who have not been pregnant for about 5 years preceding the disease. The average age of onset is in the late twenties or thirties, but several cases have been reported in teen-age girls. Treatment is briefly discussed.

## THE INTERDEPENDENCE OF THE PSYCHIC AND SOMATIC ORBIT IN GYNECOLOGY—TOXIC OVARY AND PSYCHISM

C. STAJANO

Bol. Soc. Obst. y Ginec. de Buenos Aires, 25: 419-429, 1946

The author has devoted many years of his professional career to the study of what he calls the "toxic and congestive ovary." The latter usually is the result of prolonged pelvic congestion, due to either general or local causes. Among the local causes, retroversion of the uterus seems to play the leading role. In such a condition, on account of the congestion and venous stasis, ovarian function is greatly impaired, thus giving rise to the so-called congestive ovary. The latter, as time goes on, reflects its vicious function on the psychic of the woman, besides being the source of various somatic conditions. The mental troubles thus created, as one can expect, do not respond to hormone therapy nor to any form of psychic treatment. Hormone therapy can even aggravate the condition of the patient. Cure is obtained only by correcting the cause of the pelvic congestion, i.e., the retroversion of the uterus in this case. Usually it is the less "physical" of the lesions which more profoundly reflects the psyche of the patient. And it is for this reason that they ordinarily are overlooked on pelvic examination. As a matter of fact, small chocolate cysts of the ovaries (follicular or corpus luteum cysts) are frequently responsible for various psychic disorders, besides their common symptomatologic picture. In such conditions, the ovaries become toxic, and its harmful effects are reflected into the whole organism, from which

the psyche cannot of course be separated. In such events, only surgery (uni- or bilateral partial resection of the ovaries) is apt to eradicate the toxic condition established.

There is still another condition which often accounts for psychic disorders: dysfunction of the ovaries conserved at hysterectomy. They become enlarged, cystic, and on account of their impaired function, toxic as well. Vasomotor and mental disturbances are the result of such changes taking place in the ovarian function. A similar phenomenon can be observed in some cases of myoma of the uterus treated by irradiation. In both events, surgical castration and, thereby, removal of the toxic source, relieves the nervous and mental disturbances. On the other hand, the latter are not observed following deep irradiation for treatment of genital cancer, since in such events, ovarian activity is entirely abolished. Summarizing, the gynecologist should look upon his patient as a whole physiologic complex, in which the psychic and somatic components are inseparable.

(I do not think that many gynecologists will endorse the views expressed in this paper nor that they would wish to see such terms as "toxic and congestive ovary" added to the list of gynecologic diagnoses. If the author had contented himself with the belief that in an occasional case, as with a large pelvic varicocele, pelvic discomfort in the form of a dull ache may be suffered, I do not think that any serious issue would have been taken with him. Nor would there be if he merely pleaded that treatment of the psyche should never be neglected in the management of gynecological patients, with no especial accent on those with endometriosis, since it has no more tendency to produce psychic upsets than do many other painful lesions of the pelvic organs. Again, while conserved ovaries may occasionally need later secondary removal, it is certainly not because they develop some mythical toxic effect.—Ed.)

## CO-EXISTENT PRIMARY CARCINOMA OF THE FALLOPIAN TUBE AND OF THE BREAST

J. F. CURRAN AND E. A. KILROY

*Worcester, Mass.*

*Worcester City Hospital*

New England J. Med., 236: 64-65, 1947

The writers discuss primary carcinoma of the fallopian tube and submit a report of the first case at this hospital of carcinoma of the fallopian tube and carcinoma of the breast in the same patient. The incidence of primary carcinoma of the tube has been estimated at 0.5 per cent. Important as a diagnostic aid is the presence of a serous or serosanguineous discharge from the cervix. The symptom complex of an otherwise unexplained, cramp-like, abdominal discomfort



relieved by the passage of a watery discharge from the vagina, especially when blood tinged, has been considered to be of diagnostic value by several authors.

This patient was a 50 year old Negress who was admitted complaining of intermittent pains in the right lower quadrant and of a lump in the breast. The abdominal pains had occurred for 5 or 6 years, but had become more frequent during the past 6 weeks. The breast lump had been noticed 2 years before admission, and had grown slowly in size, producing no symptoms. There were occasional low-back aches. The patient denied any weight loss, anorexia or vaginal discharge.

Five relatives of the patient's father had died of cancer—one of carcinoma of the stomach, 2 of carcinoma of the breast, and 2 of carcinoma of the rectum.

Physical examination revealed a tangerine-sized mass in the left breast; the mass was firm, nontender and firmly attached to glandular structures and to the skin. A firm, nontender grapefruit-sized mass was palpated in the left lower quadrant of the abdomen; this mass could be palpated in the left vault. A hard solid mass was palpated in the region of the uterus. Laboratory studies showed a red-cell count of 3,790,000 and hemoglobin of 68 per cent.

At operation a large ruptured ovarian cyst was removed from the left broad ligament. Both the broad ligament and left tube were removed. A supravaginal hysterectomy was performed because of a fibroid uterus. Following the abdominal operation, the breast tumor was excised and, as microscopic examination proved this to be a primary carcinoma, a left radical mastectomy was performed on the 10th postoperative day. The anemia was treated and the patient recovered. When seen 5 months postoperatively, she had gained 8 pounds.

Gross pathological examination revealed a funnel-shaped tube measuring 12 by 2.5 by 0.5 cm., with a dull and shaggy serosa. The wall was thick and fibrous, and yellow-gray necrosis, resembling caseation, was seen. Microscopically, a solid mass of tumor cells filled the lumen. These cells had an indistinct cell membrane. The nuclei were mostly oval and vesicular, with rare nucleoli. Many mitoses and a few stroma cells were seen.

The breast showed strands of tumor cells with little stroma, having poorly staining cytoplasm and dark nuclei. Few mitoses were seen. The diagnoses were primary carcinoma of the fallopian tube and primary medullary carcinoma of the breast.

The authors draw attention to the difficulty in differentiating pathologically tuberculosis and carcinoma of the tube. In all cases of tubal carcinoma a search for the giant cells of tuberculosis is essential.

(More and more cases of combined carcinomas of different types have been reported in recent years. Although there are no illustrations, the authors' description would indicate the correctness of their belief that two separate types of carcinoma were present, especially as they were obviously on their guard as to the possibility of mistaking for tubal carcinoma the markedly proliferative and adenomatous picture sometimes seen in tubal tuberculosis. While cancer is of course not hereditary there is no question that a predisposition to it may be, as would be suggested by the hereditary history of this patient. In cases in which this cancer predisposition is very strong, it is perhaps not surprising that the disease may develop in more than one form and location.—Ed.)

the psyche cannot of course be separated. In such events, only surgery (uni- or bilateral partial resection of the ovaries) is apt to eradicate the toxic condition established.

There is still another condition which often accounts for psychic disorders: dysfunction of the ovaries conserved at hysterectomy. They become enlarged, cystic, and on account of their impaired function, toxic as well. Vasomotor and mental disturbances are the result of such changes taking place in the ovarian function. A similar phenomenon can be observed in some cases of myoma of the uterus treated by irradiation. In both events, surgical castration and, thereby, removal of the toxic source, relieves the nervous and mental disturbances. On the other hand, the latter are not observed following deep irradiation for treatment of genital cancer, since in such events, ovarian activity is entirely abolished. Summarizing, the gynecologist should look upon his patient as a whole physiologic complex, in which the psychic and somatic components are inseparable.

(I do not think that many gynecologists will endorse the views expressed in this paper nor that they would wish to see such terms as "toxic and congestive ovary" added to the list of gynecologic diagnoses. If the author had contented himself with the belief that in an occasional case, as with a large pelvic varicocele, pelvic discomfort in the form of a dull ache may be suffered, I do not think that any serious issue would have been taken with him. Nor would there be if he merely pleaded that treatment of the psyche should never be neglected in the management of gynecological patients, with no especial accent on those with endometriosis, since it has no more tendency to produce psychic upsets than do many other painful lesions of the pelvic organs. Again, while conserved ovaries may occasionally need later secondary removal, it is certainly not because they develop some mythical toxic effect.—Ed.)

## CO-EXISTENT PRIMARY CARCINOMA OF THE FALLOPIAN TUBE AND OF THE BREAST

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New England J. Med., 236: 64-65, 1947

The writers discuss primary carcinoma of the fallopian tube and submit a report of the first case at this hospital of carcinoma of the fallopian tube and carcinoma of the breast in the same patient. The incidence of primary carcinoma of the tube has been estimated at 0.5 per cent. Important as a diagnostic aid is the presence of a serous or serosanguineous discharge from the cervix. The symptom complex of an otherwise unexplained, cramp-like, abdominal discomfort

No real evidence was substantiated by these studies that fistulas, dissemination of the tuberculous process, intestinal obstruction and perforation of a viscus are serious complications of roentgen-ray therapy. In fact, the writer has cured one fistula of tuberculous origin by deep x-ray therapy. Deep x-ray therapy is also useful in the absorption of exudates and reduction of secondary inflammation and infection, thereby tending to relieve and prevent intestinal obstruction. It is emphasized that the healing of the pelvic disease may favorably affect the healing of the disease elsewhere, and also, the disease elsewhere may unfavorably effect the progress of the pelvic disease. The more active the tuberculous process, the less favorable the prognosis.

In the present series roentgen-ray therapy gave excellent cures in most cases, and it must be stressed that x-ray therapy is an important adjunct following surgery. If the disease can be diagnosed by means other than at operation, then pelvic tuberculosis should be treated exclusively by roentgen-ray therapy; however, without positive evidence of tuberculosis this treatment should be condemned. 4 figures.

(This is a valuable experimental study, and its results seem applicable to the treatment of at least certain cases of pelvic tuberculosis in women. On this point there is, as a matter of fact, considerable evidence already available in the literature. The employment of x-ray in these cases has never achieved as much popularity in this country as in some others. For example, it is quite widely used in most of the South American clinics. The criticism is commonly made that pelvic tuberculosis is not usually diagnosed preoperatively, and this is a valid one. Campbell agrees that x-ray treatment should not be used unless the diagnosis is established.

However, there is a not inconsiderable group in which the disease has been established at operation, but in which the involvement is so extensive that its removal is very incomplete. These are preeminently the cases with extensive peritoneal and intestinal involvement, and in this group x-ray therapy, together with constitutional treatment and heliotherapy, must be our chief reliance. In those cases in which the tuberculosis is primarily and essentially tubal and confined to the pelvis, the results of surgical treatment are good, though they should also receive the benefits of constitutional treatment, as with tuberculosis in any other part of the body.—Ed.)

THE TREATMENT OF PELVIC TUBERCULOSIS IN THE FEMALE BY  
RADIATION THERAPY BASED UPON EXPERIMENTAL EVIDENCE  
IN THE ANIMAL AND CLINICAL RESULTS IN THE HUMAN

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*Am. J. Obst. & Gynec.*, 53: 405-418, 1947

Antagonists contend that radiation therapy of pelvic tuberculosis in the human is of no great therapeutic value and leads to (1) dissemination of the tuberculous process, (2) fistulous tract formation, (3) intestinal obstruction, and (4) that lymphocytic destruction by radiation leads to a breakdown in the healing process. In the present paper the author attempts to answer these criticisms by clinical observations on humans, and by producing pelvic disease in the animal and subjecting it to roentgen rays.

Pelvic tuberculosis was produced experimentally in 20 female dogs and roentgen-ray therapy was administered. Eight control dogs were inoculated with bovine tubercle bacilli and given no roentgen-ray therapy. The results of these experiments showed that roentgen ray was beneficial in the treatment of pelvic tuberculosis. In the entire series of 20 dogs, there was no doubt that radiation therapy tended to limit the disease to the pelvis and had a direct effect upon the absorption of the exudate and reduction of the secondary inflammation. Representative of the series of treated dogs is one animal which showed considerable enlargement of both horns and vaginal portion of the uterus after injection of tubercle bacilli. There was a slight amount of exudative and adhesion reaction present. Roentgen-ray therapy was started at 2 months, and 24 exposures were given with monthly intervals between series. At the end of a year, microscopic sections showed no tuberculosis. Six of the 8 control animals succumbed within 10 months after their injections.

Seven case reports are presented which are representative of patients with pelvic tuberculosis treated by roentgen-ray exposure in the author's clinic. From experience with such cases, it is concluded that roentgen-ray therapy, by producing a temporary or permanent castration, tends to conserve the patient's blood supply and to add to her resistance, particularly in the anemic patient. Jameson has pointed out that tuberculous women are unfavorably affected by their menses. By analogy it seems logical that due to the increased activity and vascular changes in the pelvis during the menses, a deleterious effect would be produced upon pelvic tuberculosis as it is in the lung.

The x-ray dosage as carried out in this series is not large enough to have a profound effect on the white blood cells, and the author cannot agree that it interferes with healing. Roentgen rays are useful in reducing secondary inflammation and infection which is important in the healing of a tuberculous process.

The pelvic operations undergone by 33 patients are itemized in table 1-A. With two exceptions, the case of the submucous myoma and that of the urethro-vesico-vaginal fistula, the group composed of patients with prolapse of the uterus, cystocele, and rectocele were of such severity as to incapacitate them and, in many instances, to result in bleeding, ulcerated cervixes. The indication for the myomectomy is obvious, and in gynecology nothing seems to surpass the relief and happiness of a patient whose vesical fistula is successfully repaired.

TABLE 1-A

*Pelvic operations performed on 33 patients aged 50 years and over. The average age of the group was 58.7 years*

Pelvic Operations.....	33
Vaginal hysterectomy with anterior and posterior colporrhaphy and repair of enterocele.....	24
Manchester operation with colporrhaphy.....	3
Watkins interposition.....	1
Richardson-Spalding operation.....	1
Le Fort's colpocleisis.....	2
Repair urethro-vesico-vaginal fistula.....	1
Myomectomy.....	1

TABLE 1-B

*Abdominal operations performed on 17 patients aged 50 and over. The average age of the group was 56*

Abdominal Operations.....	17
Hysterectomy, total with salpingo-oophorecystectomy or salpingo-oophorectomy....	5
Hysterectomy, subtotal with salpingo-oophorecystectomy or salpingo-oophorectomy.....	2
Hysterectomy, Wertheim.....	2
Salpingo-oophorecystectomy.....	4
Incision and drainage.....	1
Exploratory laparotomy.....	2
Repair postoperative ventral hernia.....	1

TABLE 2

*Indications for abdominal procedures carried out in 19 cases*

Adenocarcinoma, endometrium.....	1
Carcinoma, epidermoid, cervix.....	3
Myoma, uterus.....	5
Cystadenoma, serous, ovary.....	4
Cystadenocarcinoma, ovary.....	3
Cystadenoma, papillary, benign.....	1
Cyst, dermoid, bilateral.....	1
Abscess, tubo-ovarian.....	1

There were no deaths in this group. A followup of the repairs showed no recurrences. The urethro-vesico-vaginal fistula healed at the first sitting.

There were 17 abdominal procedures. The necessity for treatment in the cases of the malignant tumors cannot be gain-said. The patients operated on for ovarian cysts represented a group where the size of the cyst was such as to cause marked abdominal distention, dyspnea, and pressure symptoms. The only small cyst in this group was one in which operation was demanded because it had twisted itself on its pedicle.

## OPERATIVE GYNECOLOGY

### GERIATRICS AND GYNECOLOGY: THE ROLE OF SURGERY IN THE AGED

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Jour. Philippine Med. Assoc., 22: 323, 1946

A review of 287 major surgical operations performed in the Department of Gynecology of the North General Hospital reveals that, during the period from April 1, 1945 to July 31, 1946, 50 major surgical procedures, comprising 17 per cent of the total, were on women 50 years old or older. The average of the group was 58.2 years. Minor operations, like biopsies, dilatation and curettage, and so on, were excluded in this study, even though a considerable number were performed on elderly individuals. The operations performed are shown in tables 1-A and 1-B.

The indications for the pelvic operations are clear, since these operations were mostly on cases of prolapse of the uterus, cystocele, rectocele, and associated enteroceles of varying degrees, which were treated in the different methods already mentioned. In one case of prolapse of the uterus, both a pelvic operation (vaginal hysterectomy and anterior and posterior repair) and an abdominal procedure (repair of ventral hernia) were performed. This was a case in which prolapse of the uterus had been treated 10 years before by a ventrofixation. The uterus prolapsed within two months after the operation. The failure of ventrofixation as a treatment of prolapse of the uterus is well illustrated by the fact that the uterus had become markedly elongated and had prolapsed through the introitus, although the fundus was still well fixed to the anterior abdominal wall, which had dimpled inwards.

The indications for the abdominal operations are outlined in table 2. The diagnosis in each instance has been supported by histopathologic study of the material removed at operation.

Of these 49 patients whose average age is 58.2 years, 20 showed hypertensive-cardiovascular disease. The renal function in all was within normal limits. The nutrition of all these patients was poor. All these considered, it is necessary to find out whether the relief from discomfort, pain, and invalidism is worth the price they may have to pay. The objective of surgery is to relieve the patient of these ills and to hasten his return to health. The means used, therefore, should be safe; and the risk involved should not be more than that of the disease. Can surgery as practised today accomplish this, and if so, to what extent?

## A SURVEY OF GYNAECOLOGICAL SURGERY

VICTOR BONNEY

J. Obst. &amp; Gynaec., Brit. Emp., 54: 102-106, 1947

The author discusses various techniques of gynecological surgery. Among the new operations is McIndoe's grafting operation for the construction of a vagina. It carries no risk, and of the 46 operations which McIndoe has now performed, every patient has recovered and in only one was the desired end not accomplished. The author believes that it should replace all other methods of constructing a vagina.

The second new operation discussed is suspension of the urethra by strips of abdominal fascia to correct stress incontinence. The best technique is believed to be that introduced by Terence Millin, whereby the suspension is effected entirely through the abdomen, rather than by the two-way approach.

The writer believes that while in expert hands the risk of removing the whole uterus is very little greater than removing the corpus only, in the hands of many operators it is quite otherwise. In the author's 500 Wertheim operations there were 7 stump carcinomas and in 3 of them the growth was undoubtedly present when subtotal hysterectomy was performed. An obviously unhealthy cervix should of course be removed with the corpus, but for the remainder, the policy should be conservative.

Hysterectomy, rather than myomectomy, is still being performed by the less skilled in cases where the conservative operation would be just as feasible and safe, or even safer. As far as the technical difficulties dependent on the number, size and position of the fibroids are concerned, myomectomy can be carried out on at least 95 per cent of cases.

Conservative surgery has been further enlarged by the operation of ovarian cystectomy, whereby ovarian cysts are shelled out and the whole of the ovarian substance conserved. The conservative surgery of the Fallopian tubes (salpingostomy, tubal re-implantation) has yielded disappointing results, but the author believes that success can be obtained and that imperfect technique is the cause of its rarity.

The older method of ventral fixation for retroversion is not often performed nowadays. It is pointed out that fixation of the anterior wall has absolutely no effect upon pregnancy or labor, and there are times when it should be chosen instead of round ligament shortening. The vogue for removing the uterus as part of the operation is held as an entirely unnecessary procedure, unless of course there is a cause for removal in addition to prolapse.

Chief among the adjuncts to gynecological surgery which have brought about marked improvement in the past 40 years is blood transfusion. Spinal and intravenous anesthesia have likewise contributed to the improvement. Attention is now being directed to the prevention of air infection.

(The author of this paper, long a leader in British gynecology, is probably best known in this country because of his life-long advocacy of radical surgery in the treatment of

There was a death in this group, a 55 year old patient, toxic and cachectic on admission. Exploratory laparotomy revealed ovarian malignancy with extensive metastases. The mortality in this group is 5.8 per cent. On the credit side we have two patients who underwent the extensive Wertheim operation, radium and x-ray therapy not being available. To date, the postoperative result has been excellent. No evidence of recurrence has been seen. It is, of course, too early to make any statement as to their ultimate prognosis; but today they are very much alive, they are free from symptoms, and they can look forward to the future at least with some hope and equanimity.

The same statement, even with more justification, may be made of the patient with carcinoma of the endometrium. In the three cases of carcinoma of the ovary, although excision of the tumor and pelvic organs was carried out completely, only time will tell whether the operation was justified or not. True, the prognosis of ovarian cancer is, at best, poor. However, for the time being, these patients are up and about and asymptomatic.

The author feels that in the aged especially, the vaginal approach is better and safer than the abdominal. The patients who underwent vaginal operations showed less morbidity, complications, anorexia and distention, and in general presented a smoother convalescence. Interestingly enough, since they took special pains to observe the course of these aged individuals, they have noticed that on the whole there is a relative absence of severe postoperative systemic reaction in the aged. They exhibit less morbidity and less prostration, and they feel better than a group of younger patients undergoing the same procedures. Meticulous preoperative-postoperative care, proper anesthesia, prevention of shock, gentleness in the handling of tissue, and early ambulation are important.

(The author of this paper is a highly trained obstetrician and gynecologist, who for a number of years was a valued member of the obstetrical staff of the Johns Hopkins Hospital. Always loyal to the country of his birth, he returned to Manila with the invading army of Gen. MacArthur, and entered at once on the practice of his specialty in that sadly stricken city. Under the influence of such young men as this, trained largely in American clinics, nothing is more certain than that the standards of medicine in the Philippine Islands will soon reach a higher level than ever before.

The list of operations and indications, as tabulated, shows a wide variety in spite of the relative smallness of the group. The author is evidently partial to the vaginal route for hysterectomy in older individuals, and not many will dispute the greater safety of this technique. For that matter, in the really aged and debilitated, vaginal hysterectomy, when indicated, is usually easily accomplished under local anesthesia. Gynecologists will no doubt differ, in the Philippines as in our own country, in their leaning toward either the vaginal or abdominal route, just as they differ in their preference for one type or other of the various plastic procedures for prolapse, cystocele and rectocele.

I have one bitter criticism to make of this paper. The author's title refers to the "role of surgery in the aged", and he includes under this designation of "aged" all patients over 50. What do you mean, "old"? Being a little over this deadline myself, I think I was pretty generous to say anything nice about this paper and the callow youth who wrote it.

—Ed.)



are given. Uterine bleeding may be controlled by the injection of 25 mg. stilbestrol into the anterior lip of the cervix uteri. On the day preceding operation the vagina is prepared as for cesarean section. Five per cent glucose in normal saline solution is given on the night before and on the morning of operation. After entering the abdomen, myomectomy, even multiple (the author has removed as many as 23 fibroids from a uterus), is performed, unless the uterus is too distorted, or the endometrium almost entirely extricated in removing the fibroids, or in the presence of adnexal disease, when hysterectomy becomes the choice. During multiple myomectomy, as each tumor is enucleated its cavity is sewn up from bottom to top and the line of incision is peritonealized. The entire muscular wall of the uterus is palpated carefully in order to detect a small fibroid.

Since all submucous fibroids are accompanied by infection of the endometrium, particularly about the base of the pedunculated and in the necrotic areas of the sessile types, the sulfonamides and penicillin are used preoperatively, during operation and postoperatively to control and prevent infection. Sixty grains of sulfadiazine and 300,000 units of penicillin are given on the day before operation, and at least 300,00 units of penicillin is given on the day of and 3 days following operation. Five gm. of sulfathiazole and sulfanilamide crystals are sprinkled on and about the operative field before closing the abdomen.

In operating for the submucous pedunculated fibroid, an endometrial cuff is made around the base of the pedicle, the pedicle is resected from the muscular wall, hemostasis is effected with chromic catgut, and the wound is covered with the cuff. In the case of the submucous sessile fibroid, the endometrium is incised and dissected from over the tumor, the tumor is enucleated from its bed and the area covered with endometrial flaps. Before closing the uterus, the cervix is dilated from the uterine cavity to insure adequate postoperative drainage. Moreover, passive congestion is both conducive to infection and inimical to tissue healing. Therefore, a uterine retroversion is corrected and the head of the bed is elevated for 5 or 6 days following operation.

The objections by opponents of myomectomy such as hemorrhage, infection, adhesions and tumor recurrence have been effectively overcome in the author's procedures. It is hoped that the widespread use of myomectomy, as described in this paper, will merit its recognition as the procedure of choice in the surgical treatment of uterine fibroids.

(This is an excellent paper from the Freedmen's Hospital Clinic, conducted by a colored staff for colored patients, and doing a very creditable work. The fact that the author himself has performed 900 myomectomies qualifies him to speak authoritatively as to the technique, the indications and the results. Taking the country by and large, there is no doubt that too few myomectomies are done, and that hysterectomy, often a much easier operation, is often resorted to when myomectomy would have been the wiser choice. This naturally applies especially to the numerous cases of myoma in comparatively young women in whom the possibility of future child-bearing is of great importance.)

In such cases there is not only full justification but clear indication for the selection of myomectomy, even though the tumors be numerous and perhaps of considerable size. There can be no question that the presence of myomas imposes a considerable degree of at least relative infertility, and I have been impressed with the frequency with which rather

cervical carcinoma, both before and throughout the years when, except in his own and a few other clinics, radiotherapy was the universally favored plan. It is of interest to note that he prefers subtotal to total hysterectomy except when the cervix is diseased. His position is based on the low incidence of stump carcinoma in his series, much lower than that reported by many others. However, aside from this point, a retained stump may later give rise to annoyance and uneasiness because of troublesome leucorrhea and bleeding, even though malignancy may not be present. The pros and cons of this question have been so widely discussed that they need not again be elaborated. The tendency in this country has been increasingly in favor of the total procedure when there is no contraindication, as there so frequently is, imposed by the conditions within the pelvis or by the personal limitations of the surgeon.

I do not think that most gynecologists will agree that in at least 95 per cent of myoma cases myomectomy should be selected over hysterectomy. It can be freely conceded that all too often the uterus is removed when it would be easy, safe and wise to perform myomectomy. This is pre-eminently the case where future reproductiveness is an important procedure. In such instances the gynecologist can and should go to great lengths in conserving the uterus, so that many nodules, often of large size, can be removed, with often a rich reward to the patient. But in the numerous cases of multiple and relatively large growths in women who have previously borne children and who are approaching middle life, myomectomy would be more of a surgical stunt than a wise procedure under the circumstances.

Bonney does not make out a good case for the ventral fixation once so popular for the correction of retrodisplacements. The reason it did not more often interfere with pregnancy is that it did not long remain a fixation, the peritoneum stretching out into a long thong-like band, with recurrence of the displacement and sometimes intestinal obstruction. I have, at later operation in such cases, seen such bands many inches in length. Certainly, however, everyone will agree with Bonney that there is no excuse for hysterectomy for retrodisplacements *per se*.—Ed.)

## SURGERY IN THE UTERINE FIBROID, A PLEA FOR MYOMECTOMY

J. W. Ross

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*Am. J. Obst. & Gynec., 53: 266-270, 1947*

The mere presence of a uterine fibroid should not be an indication for surgery. Only incontrovertible reasons, such as hemorrhage, pain, pressure symptoms, signs of tumor degeneration, rapid growth, interference with the pregnant states, cosmetic and marital purposes should indicate surgical intervention.

Myomectomy, even multiple, whereby endocrine balance, menstruation and reproductive possibility are preserved, should be preferable to hysterectomy, and the author presents an outline of preoperative, operative and postoperative preparation, technique, and care which have enabled him to perform successfully 900 consecutive myomectomies for the interstitial and submucous types of fibroids with complete control and/or prevention of infection.

Preoperatively, all foci of infection in the body are vigorously treated and if the red blood count is below 3,500,000, small therapeutic blood transfusions

are given. Uterine bleeding may be controlled by the injection of 25 mg. stilbestrol into the anterior lip of the cervix uteri. On the day preceding operation the vagina is prepared as for cesarean section. Five per cent glucose in normal saline solution is given on the night before and on the morning of operation. After entering the abdomen, myomectomy, even multiple (the author has removed as many as 23 fibroids from a uterus), is performed, unless the uterus is too distorted, or the endometrium almost entirely extricated in removing the fibroids, or in the presence of adnexal disease, when hysterectomy becomes the choice. During multiple myomectomy, as each tumor is enucleated its cavity is sewn up from bottom to top and the line of incision is peritonealized. The entire muscular wall of the uterus is palpated carefully in order to detect a small fibroid.

Since all submucous fibroids are accompanied by infection of the endometrium, particularly about the base of the pedunculated and in the necrotic areas of the sessile types, the sulfonamides and penicillin are used preoperatively, during operation and postoperatively to control and prevent infection. Sixty grains of sulfadiazine and 300,000 units of penicillin are given on the day before operation, and at least 300,00 units of penicillin is given on the day of and 3 days following operation. Five gm. of sulfathiazole and sulfanilamide crystals are sprinkled on and about the operative field before closing the abdomen.

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prompt pregnancy occurs after such operations in women previously sterile for perhaps many years.

An important part of the technique is the peritonealization which should be carried out, and this can usually be accomplished even though the tumors are numerous. Often a number of the tumors are removable through the same incision. On the anterior surface peritonealization can usually be easily and completely carried out by suturing the round and broad ligaments over the upper part of the anterior surface, after the fashion of the Coffey hysteropexy. This has an additional virtue in that the uterus from which large growths have been removed has a tendency to flop backward, and this form of suspension will overcome this. Myomectomy wounds lower on the anterior surface can be easily peritonealized by covering them with a fold of the loose vesico-uterine peritoneum. The posterior surface may present more difficulty, but here the wounds can often be smoothly closed by inverting the peritoneal surface.

There is always the theoretical possibility that other growths will reappear in later years, probably often from seedling myomas overlooked at the time of operation. But most women are only too willing to take this slight gamble, in the justifiable hope that they may have one or more children before any later growths become a clinical problem.—Ed.)

## AN EVALUATION OF PRESACRAL NEURECTOMY IN THE TREATMENT OF DYSMENORRHEA

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Am. J. Obst. & Gynec., 53: 226-232, 1947

The author reviews the results of 255 cases of presacral neurectomy for dysmenorrhea of both the essential and the acquired types. This series is divided into 2 sections—those performed in the first 10-year period from 1931 to 1940 (136 cases), and those performed in the 5-year period from 1941 to 1945 (119 cases)—which are compared in respect to results.

Of the cases in the first 10-year period, 116 were suitable for consideration. Of these, 78 cases were of essential dysmenorrhea and 38 cases were of acquired dysmenorrhea. Complete relief was obtained in 73 per cent of the essential dysmenorrhea group, partial relief in 14 per cent and total failure in 13 per cent. In the acquired dysmenorrhea group, however, only 37 per cent were well following operation, 26 per cent were somewhat relieved and 37 per cent were not benefited in the least.

Of the cases in the recent 5-year period 93 were suitable for study. In 59 of these essential dysmenorrhea was considered present; in 34 cases acquired dysmenorrhea existed. In the essential group, 84.6 per cent reported complete relief, 6.8 per cent reported partial relief and 8.4 per cent were total failures. In the acquired group only 29.4 per cent reported success, 23.5 per cent reported partial relief and 47.1 per cent obtained no relief at all.

The results for the combined series of 209 cases suitable for consideration are

as follows: Of 137 cases of essential dysmenorrhea, complete relief was obtained in 78 per cent, partial relief in 11 per cent and total failure in 11 per cent. Of 72 cases of acquired dysmenorrhea, complete relief was afforded in 33.3 per cent, partial relief in 25 per cent and total failure in 41.7 per cent.

The offending pathologic conditions in the 72 cases of acquired dysmenorrhea are reviewed. Pelvic inflammation and endometriosis made up about 60 per cent of this group, pelvic inflammation occurring in 36.6 per cent and endometriosis in 24.0 per cent. Only 3 cases of pelvic inflammation in which a conservative operation was carried out (together with presacral neurectomy) showed relief. No benefit as far as dysmenorrhea was concerned was derived by 64.4 per cent; this represents the largest single group of failures encountered. In endometriosis, after conservative operative treatment, 40 per cent obtained complete relief and 30 per cent were total failures. It is pointed out that 21 per cent of cases in the 2 categories of pelvic inflammation and endometriosis came to total hysterectomy 9 months to 4 years after presacral neurectomy was performed.

The author wishes to emphasize that presacral neurectomy is still a last resort in the treatment of dysmenorrhea, that the operation carries with it the risks of laparotomy, and that good medical management should be attempted in each individual case before resorting to surgery unless other indications for laparotomy exist.

(The author's results in his primary group correspond pretty well to those generally reported, though perhaps slightly better, the complete relief rate being usually put at from 60 to 70 per cent. It is rather surprising that the results in the secondary group are so comparatively unfavorable. My own impression, though I have no available figures, would be that presacral neurectomy as a part of corrective operations for such conditions as endometriosis, marked uterine retroflexion, and pelvic inflammations, has given me much better results than those reported by the author. As a matter of fact, more of my neurectomies have been performed on such cases than for primary dysmenorrhea per se. The author very wisely emphasizes that neurectomy should be almost the last resort in the treatment of dysmenorrhea and not among the first, as it seems to be in the minds of some gynecologists. After all, the vast majority of dysmenorrheics can be made at least reasonably comfortable by simpler and safer methods of treatment.—Ed.)

## THE SURGICAL TREATMENT OF PHLEBOTHROMBOSIS IN OBSTETRIC AND GYNECOLOGIC PATIENTS

F. W. BANCROFT

*New York, N. Y.*

*Am. J. Obst. & Gynec.*, 53: 109-116, 1947

In cases of thrombophlebitis, with elevation of temperature, where there is not much risk of embolic formation, lumbar sympathetic block will relieve pain and hasten convalescence of the individual. However, where phlebothrombosis

is present and there is danger of pulmonary emboli, it is the writer's firm conviction that the operative approach and ligation of the vein is safer than relying upon the use of anti-coagulants or lumbar sympathetic block. While Murray and others have reported excellent results from the use of anti-coagulants without operative interference, the author believes that convalescence is safer and shortened by either proximal ligation or thrombectomy. He has performed 2 preoperative thrombectomies in preoperative gynecologic cases, 2 thrombectomies in postoperative gynecologic cases and 3 in obstetric patients post partum. These case histories are briefly reviewed.

In pregnant patients who develop attacks of thrombophlebitis, a proximal ligation of the long saphenous vein may save the patient considerable distress and some danger at term. If the previous pregnancy has been complicated by a phlebitis of the long saphenous vein, prophylactic proximal ligation may be advisable. If it was accompanied by a deep femoral phlebitis, dietary measures and the use of anticoagulants pre-partum and after 5 or 6 days post partum may be helpful. The author suggests that sodium thiosulfate be administered 5 or 6 days before delivery, and after 5 days post partum, either sodium thiosulfate or dicumarol can be given. The same method of approach may be used in gynecologic patients who require an operative procedure and have a previous history of phlebothrombosis.

Several questions concerning thrombectomy are discussed. First of these is whether there is not danger, in removing the clot, of breaking off the clot and having it extend upward into the vein. In 20 cases on which the writer has performed thrombectomy, he has had one patient in whom he is fairly convinced that a small piece of thrombus ascended upward into the thorax. In order to prevent the recurrence of thrombi above where the ligation has been performed, some workers administer anticoagulants after the thrombectomy, while others have not used anticoagulants routinely and have not had any severe recurrence of thrombosis after ligation and thrombectomy. In the majority of cases there is no residual swelling of the leg following ligation.

Many of the thrombotic processes originate in the veins of the broad ligament, and to successfully treat a gynecologic or obstetric case, if the patient will stand the procedure, a bilateral approach is the best procedure.

The use of anticoagulants is reviewed. In order to prevent thrombosis and embolism, sodium thiosulfate is considered less dangerous and more controllable than dicumarol. If thrombosis has occurred, sodium thiosulfate does not compare in any way with heparin or dicumarol. Loewe's method of using heparin subcutaneously by injections at 2 to 3 day intervals is presented.

(Whether or not to ligate in cases of thrombophlebitis and especially phlebothrombosis is still a very fluid question, certain clinics being enthusiastic as to its frequent advantages, while perhaps the majority prefer more conservative management, now usually including the use of anticoagulants. For a rather full discussion of the subject the reader may be referred to the papers of Collins and Nelson, and Meigs, both ardent advocates of the plan, while the conservative point of view was expressed by a number of the discussors of these papers (*Am. J. Obst. & Gynec.*, Dec., 1946).—Ed.)

## BACTERIOLOGY OF VAGINA IN TOTAL HYSTERECTOMY

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Am. J. Obst. &amp; Gynec., 53: 324-325, 1947

It is concluded that infection from the vagina after adequate preparation is almost negligible in cases of total hysterectomy. This conclusion is based on the findings in 133 consecutive total hysterectomies. The smear reports in this group showed 90 negative and 43 positive. Of the 43 positive smears, 20 were gram positive cocci, 4 were gram negative cocci and 20 were gram negative bacilli. The culture reports were negative in 87 cases and positive in 46. Of the 46 positive cultures, 29 were *B. coli*, 19 were staph. albus, 9 were enterococci, 5 were microcatharalis and one was hemolytic staph. aureus.

The clinical course was uneventful in 124 patients. The remaining 9 had complications, none of which were serious.

Preoperative preparation of the vagina was as follows: Before anesthetic examination of the pelvis, the vagina is wiped out with a dry sponge and swabbed with tincture of Zephiran. After examination and the indicated vaginal procedure have been carried out, the vagina is well cleaned and tincture of Zephiran is again generously applied. Often a dram or 2 is left in the vagina before proceeding with the abdominal procedure.

In 41 cases varying amounts of sulfanilamide or sulfathiazole powder were dusted about the pelvis. In 92 cases no sulfonamide was used. The clinical course of those women who received sulfonamides was no different from those in the nonsulfonamide group.

(Most gynecologists will agree that after adequate preparation, infection from the vagina is a hazard that causes us little concern in total hysterectomy. A paper was recently abstracted in the Survey, with editorial comment, in which the author actually advised against any vaginal preparation at all, an idea which will not appeal to any surgeon who has any faith in the antiseptic, if not aseptic, principles involved. It is quite certain that many laparotomy patients would escape any infection if there were no preliminary disinfection of the skin. The latter does not destroy all organisms, but everyone accepts that it vastly minimizes the hazard of both intraabdominal and abdominal wall infection. No less important than preliminary vaginal preparation, and possibly more so, is careful technique during the total hysterectomy, especially as to avoidance of abdominal infection from sponges and instruments which have been potentially contaminated by introduction into the vaginal canal.—Ed.)

is present and there is danger of pulmonary emboli, it is the writer's firm conviction that the operative approach and ligation of the vein is safer than relying upon the use of anti-coagulants or lumbar sympathetic block. While Murray and others have reported excellent results from the use of anti-coagulants without operative interference, the author believes that convalescence is safer and shortened by either proximal ligation or thrombectomy. He has performed 2 preoperative thrombectomies in preoperative gynecologic cases, 2 thrombectomies in postoperative gynecologic cases and 3 in obstetric patients post partum. These case histories are briefly reviewed.

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## STERILITY

### THE EFFECTS OF LOW ATMOSPHERIC PRESSURE ON THE FERTILITY OF MALE RABBITS

A. WALTON AND W. URUSKI

*Cambridge*

J. Exper. Biol., 23: 71-76, 1946

Seventeen sexually mature rabbits were kept in an air chamber at different reduced pressures for various periods of time. There was a constant supply of fresh air, so that there was no accumulation of CO<sub>2</sub>, moisture or other gaseous products of metabolism. Semen was collected twice weekly and examined for motility, number of spermatozoa and spermatogenetic cells, and percentage of abnormal spermatozoa. Some rabbits were killed after exposure and the testes, epididymides and vasa deferentia were dissected out and examined.

The effect of this experiment upon the spermatozoa was most marked and appeared in about 10-14 days' time. The total number of spermatozoa in the ejaculate decreased, but an even more striking change was the decrease in motility and the increase in abnormal forms.

After treatment was stopped all animals made complete recoveries, and after some delay the semen gradually returned to normal. Of the animals killed for autopsy after exposure to a pressure of 210-260 mm. Hg. for 16 hours daily, one rabbit exposed for one day only showed no changes in the testicular tubules. This degeneration was more marked in an animal exposed for 5 days and was very severe in an animal exposed for 6 days. In the last example, very few spermatozoa were present in the tubules and the germinal epithelium was reduced to a few cells in depth.

### STUDIES ON IMPAIRED FERTILITY IN THE MALE

R. HAMMEN

*Copenhagen, Denmark*

Human Fertil., 2: 65-71, 1946

As a result of this study of 957 men, the vast majority of whose marriages were barren, it is concluded that a diagnosis of absolute sterility is justified only in cases of azoospermia. Three-fourths of the men examined were between 25 and 35 years of age. In 65 per cent the childlessness had lasted more than 3 years. A total of 1184 sperm examinations was performed; the semen was

## THE PROBLEM OF TALCUM POWDER AND CONTRA-INDICATIONS FOR ITS EMPLOYMENT

F. M. DOUGLAS

*Toledo, Ohio*

Am. J. Obst. &amp; Gynec., 53: 500-504, 1947

The author again calls attention to the harmful effects of magnesium silicate when introduced into the body tissues in the form of surgical glove powder. Lambert and others have previously demonstrated these effects. One or more fine particles of the silicate will form lesions seen microscopically as small fibrotic areas. When the powder is introduced in larger quantities, large and definitely granulomatous lesions with typical foreign body giant cells will be observed. Once this substance has lodged in the tissues, it will continue to act as an irritant until it is removed. Previously, the writer has described the action of magnesium silicate in producing peritoneal adhesions after abdominal surgery.

A study has been made of all old healed incisional scars removed surgically after a period of several months in various hospitals. In every scar so removed, definite lesions containing magnesium silicate crystals could be demonstrated. As a result of these findings the author concludes that many cases exhibiting postoperative incisional pain and tenderness may be charged to inflammatory reaction generated by magnesium silicate crystals deposited by the gloved hands or drains at operation.

Until a substitute is introduced, practical considerations require a technique for avoiding damage from magnesium silicate. The author proposes that only enough magnesium silicate powder be applied to the inside of the gloves before dry sterilization to prevent adhesion of their surfaces. Cream of tartar may be applied to the hands in small quantities to assist the hands into the sterile gloves. All powder remaining on the external surface of the gloves may be removed by washing through 2 basins of sterile water. All other rubber articles required in operation may be sterilized by boiling, and no powder applied. 4 figures.

(During recent years a good many studies have been made as to the disadvantages and the undesirable results from the common use of talcum glove powder. While such studies have apparently clearly established the frequent occurrence of granulomatous lesions, often with foreign body giant cells, I am sure that many surgeons must have wondered whether these are of as great practical importance as some believe. I have talked this over with a number of my surgical friends, and thus far have not found one who could recall any unpleasant complications which he could attribute to glove powder. This is of course a very reactionary and probably very superficial attitude, for it is entirely possible that the powder may actually be responsible for a proportion of adhesions, incisional pain or infection, or other complications. Certainly the experimental studies which have been made are all to the good, and I have no doubt that all surgeons will be only too glad to adopt any ideal glove powder which may be developed for entirely safe use.—Ed.)

## TIMING OF ENDOMETRIAL BIOPSY

MARGARET HADLEY-JACKSON

*Devon County Council*

J. Obst. &amp; Gynaec. Brit. Emp., 54: 86-90, 1947

A series of 35 cases is described in which material for endometrial biopsy was obtained in the same cycle in which conception occurred without apparently interfering with the pregnancy. It is suggested that, in view of the well-recognized phenomenon of deciduoma-formation following traumatization of the endometrium in animals, it may be something more than chance that pregnancy followed upon the taking of endometrial biopsy in these 35 subfecund women, and that the slight trauma inflicted by obtaining a biopsy may have a mildly therapeutic effect.

With the exception of one case, all of the patients in this series complained of inability to conceive or difficulty in carrying a pregnancy to term. They had, on the average, been trying to become pregnant for 2 years (shortest time 3 months, longest  $4\frac{1}{2}$  years). The average age was 30 years (youngest 19 years, oldest 41 years). Nineteen had not had a previous pregnancy; 5 had each had one child born alive; the remainder had had varying numbers of miscarriages, stillbirths and livebirths (one patient had had 4 miscarriages). In 17 cases, except for routine pelvic examination, endometrial biopsy was the only procedure carried out and no treatment was given prior to the cycle in which pregnancy occurred. In 14 cases a tubal insufflation had been done and 5 of these and the remaining 4 patients had received treatment of various sorts. Seven biopsies were performed before the 14th day—most probably before ovulation had occurred, and 30 were taken on or after the 14th day, 18 of these between the 25th and 35th day, probably after embedding had started. On the whole, the microscopic appearance of the endometrium was what would be expected for the time at which biopsy was taken. There were a few exceptions, and it was noted that the greatest variation in degree of development was found in biopsies taken between the 21st and 26th days of the cycle.

Of the 36 pregnancies which started in the cycles when these biopsies were obtained, 22 are known to have resulted in the full-term delivery of normal, living infants; one ended prematurely with delivery of a stillborn macerated fetus; 4 ended in spontaneous miscarriages at 2 to 5 months; 8 are now pregnant; and one therapeutic abortion was performed. Of the 4 patients who miscarried between 2 and 5 months, 2 have subsequently become pregnant and been delivered of full-time live infants. 6 figures.

(It is difficult to understand why 7 of the author's biopsies were done before the 14th day of the cycle, as not much is to be learned of endometrial reactions at this phase. Certainly biopsy at this time can throw no light whatever on whether or not ovulation occurs with that particular cycle. The ideal time for this purpose is at the very onset of menstrual bleeding, because this avoids the danger of dislodging a very early implantation

studied for volume and appearance of ejaculate, viscosity, motility and viability of sperm, sperm count and morphology.

There was found to be no foundation for the common view that the capacity for fertilization suddenly ceases when, for instance, the sperm count falls below 60 million per cc., or when the frequency of abnormal forms exceeds 20 per cent. On the contrary, there appears to be a gradual transition from high to low degrees of fertility.

It is suggested that the frequency of abnormal forms in human spermatozoa is directly related to the extent of abnormal areas in the seminiferous tubules, so that a large number of abnormal sperm cells means relatively large areas of pathological parenchyma. In the light of this explanation, the presence of 35 per cent abnormal forms in an ejaculate would not, as claimed by Moench, be accompanied by sterility, on the ground that the presence of over 20 per cent abnormal forms indicates a defective spermiogenesis, but rather would imply only an impairment of fertility. From the present study, it can be stated that even pronounced degrees of morphological abnormality are compatible with a certain degree of clinical fertility. Nevertheless, the morphological examination may be the most important because it is more stable than other factors. It is suggested that it would be reasonable not only to let the border between normal and abnormal sperm cells be more fluctuating, but also to give the incidence of abnormal forms with less exactness.

The results of the author's investigation indicate the need for a change in attitude of the physician to the sterile couple. Should a year of marriage with normal coitus not result in pregnancy, it is highly probable that fertility is impaired and examination should not be deferred. Furthermore, examination should not be discontinued at the first disclosure of abnormality, but should be carried through, and in the wife as well, so that all factors may be treated and the degree of fertility raised.

(In spite of the great advance made in the study of the masculine factor in infertility, there is still some confusion and uncertainty on certain aspects, especially those pertaining to semen evaluation. Everyone will now agree that the 60 million count is not a line of demarcation between the sterile and the fertile man, and many men of known fertility have been shown to have counts consistently well below this limit.

The most provocative item in Hammen's paper deals with the matter of the proportion of abnormal sperm cells, and his suggestion that a large proportion may simply indicate large localized areas of the pathologic parenchyma, and thus may be quite compatible with essentially normal fertility of other sperm cells. This is in contrast with the rather general view that there is at least some degree of parallelism between the count, the percentage of abnormal forms, and the relative degree of fertility or infertility of the patient.—Ed.)

to 100.8 degrees F. on the fourth day after injection, remained elevated for 4 days and then returned to normal. The white count on the seventh day after injection was 8100. During the next 9 days the pain disappeared, temperature remained normal, and the patient was discharged. She has had no recurrence of the pulmonary symptoms.

The authors suggest that both the time of operation and the amount of oil injected before the roentgenogram was studied may have been ill advised; and possibly the cannula on the Hyams' apparatus perforated the endometrium. It is suggested that uterosalpingography should not be done until 8 to 10 days after operation on the uterus or following the cessation of menstruation. Since their experience with this case, the authors' technique of oil injection has been modified to consist of the injection of 2 cc. of iodized oil under manometric control; the roentgenogram is taken, developed and examined before further oil is introduced. If, and as necessary, more oil is introduced and immediate roentgenographic examination is made. A blunt tipped cannula is used, since in the presence of a submucous fibroid or malposition of the uterus, trauma may easily occur, especially if the cannula tip is sharp. Close cooperation between the roentgenologist and gynecologist is important in the prevention of intravasation of oil into the uterine vascular channels. 3 figures.

(The comparative advantages and disadvantages of tubal insufflation and hysterosalpingography have been discussed a number of times in previous issues of the Survey. The two methods should of course not be pitted against each other, for there is a place for each, even though one may prefer one or the other for more or less routine use in the study of sterility problems. While the hazards of hysterosalpingography are numerically not great, it cannot be forgotten that a good many cases of intravasation and embolism have been reported. On the other hand, I believe it is still true that not a single case of embolism has been reported following tubal insufflation when the gas used was carbon dioxide as should always be the case.—Ed.)

## EXPERIENCES WITH ARTIFICIAL INSEMINATION

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*Human Fertil., 2: 72-74, 1946*

The writer reports the results of artificial insemination performed upon 147 patients. In 141 instances the inseminations were undertaken because of sterility, 4 women were inseminated because of habitual abortion, and 2 for the prevention of hereditary disease. The group of 141 sterility cases is further subdivided as follows: (1) 80 women were artificially inseminated because of deficiency of their husbands' semen; (2) 4 women were inseminated because of difficulties in coitus; (3) 57 women were inseminated for sterility of unknown

and also because it avoids misinterpretations in the event of unexpectedly long cycles. If done at this time, there is no objection, and considerable advantage, in doing a fairly complete curettage, as with a suction curette. This requires only a few moments and it yields a far more comprehensive idea of the endometrium than can be gotten from a small bit.

It is of course not always practical to do biopsies at the very beginning of the flow. If this is not done, the patient should be instructed to record the date on which the ensuing period occurs, as knowledge of this will permit of more intelligent evaluation of the endometrial picture. I know of a number of instances in which premenstrual biopsy failed to interfere with an already fertilized and undoubtedly implanted egg, the curette, if this is the biopsy instrument used, luckily missing the implantation area. The author suggests that, on the basis of Loeb's well known work on the formation of deciduomata following endometrial irritation in animals, decidual formation may actually be improved after endometrial biopsy. I am sure, however, that she does not mean to suggest this as a therapeutic adjuvant.—Ed.)

## OIL EMBOLISM FOLLOWING HYSTEROSALPINGOGRAPHY

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*Massachusetts General Hospital*

*Am. J. Obst. & Gynec., 53: 307-311, 1947*

The case is reported of a 43 year old woman, *pari iii*, who complained of pain of several months' duration in the left lower quadrant and in the left side of the pelvis, and an associated vaginal discharge with burning and itching. No masses were felt in the abdomen. The cervix was lacerated and infected, with several nabothian cysts, and the uterus was in third degree of retroversion. A vaginal smear showed active *Trichomonas vaginalis*, for which treatment was given.

The pelvic pain persisted, and a uterosalpingogram was done one day after the period ceased in order to rule out a left-sided pelvic mass. After a Hyams' apparatus had been passed into the dilated cervix, 2 cc. of iodized oil was injected and a roentgenogram taken. Three more cc. of oil were injected and another film was taken; and another 3 cc. of oil followed by a third roentgenogram. The patient experienced no untoward reaction, and went home the same day.

The roentgenograms showed a large amount of oil in the vessels outside the uterus with some extension into the ovarian veins. Close inspection of the upper margin of the film showed minute linear shadows which appeared to be iodized oil in small vessels of the lung.

On the second day after the injection the patient had pain in both sides of her chest, greatly aggravated by deep breathing, but she had no cough or sputum. She was readmitted to the hospital, and a roentgenogram of the chest taken 7 days after the oil injection revealed numerous rather patchy shadows of increased density which were consistent with infarcts. The patient's temperature rose

## MISCELLANEOUS

### PERSONALITY STUDIES IN MENOPAUSAL WOMEN

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*McGill University and Allan Memorial Institute of Psychiatry*

*Am. J. Psychiat.*, 103:358-368, 1946

Fifty women with the diagnosis of "menopausal syndrome" were examined psychiatrically in order to determine the nature and causes of psychological reactions associated with the menopause proper. The patients were seen in one or more interviews. Psychiatric and social histories were taken, and in all but 5 cases a Rorschach test was administered. The data thus obtained were supplemented from the medical record and by the social service department. Whenever possible, follow-up studies were made.

Of the 50 women examined, "menopause" in the literal sense, i.e., actual cessation of menstruation, was present in 40 cases; in the remaining 10 there was no cessation of menses but the diagnosis had been made on the basis of clinical symptoms and gynecological examination. Twenty-three of the strictly menopausal patients had undergone an artificial menopause. Patients who had primarily been sent to psychiatrists were excluded from the study. However, 23 of the women had received psychiatric consultations prior to participation in this investigation. All patients were of the poor or marginal economic class.

A survey of the patients' physical complaints revealed that in every case hot flushes were present. Next in frequency came headache, always felt in the middle parietal or occipital region, abdominal discomfort, backache and painful sensations in the limbs. Paraesthesias consisted either of those of the peripheral nerves or of the special senses. Complaints referable to the heart occurred in only 4 cases.

The most frequent characteristic of the patients' emotional pattern was depression. Forty-one women complained of a depressive reaction which varied in intensity from a vague complaint of feeling "blue" to complete inability to work, severe insomnia and a sense of utter hopelessness. The depression had several characteristic features. Firstly, it was frequently poor in content. Secondly, in all cases but one, guilt feelings or tendencies toward self-accusation were completely absent. Even in the particular case, ideas of guilt lacked the incongruity often characteristic of such ideas in functional affective disturbances. Thirdly, the flow of thought was as a whole undisturbed. Although 16 patients complained of psychic tension, anxiety did not occur as a spontaneous complaint. As a whole, the depression was combined with irritability, particularly with oversensitiveness to "people and noises."

In correlating the physical symptoms of the patients with the emotional

cause (all examinations on these women showed no cause for sterility; 40 of the men had normal semen).

The author's technique consists of the injection of 2 to 3 drops of seminal fluid into the cervix without any previous dilatation. Vaginal douches with glucose or alkaline solutions prior to insemination have been found not to affect the results. After insemination, the woman remains sitting for 10 to 15 minutes before leaving. Inseminations are carried out between the 10th and 18th day of the cycle, not more than 2 or 3 times during one cycle. Only once did a single insemination prove successful.

Of the 147 patients upon whom artificial insemination was performed, 44 women conceived and 30 gave birth to healthy infants. There were 4 miscarriages and 10 women have not yet delivered. Of the infants born, 20 were males and 10 were females.

Of the 80 patients inseminated with donor's semen because of defective sperm in the husband, 40 conceived. Of the 4 cases of incomplete coitus, inseminated with the husband's semen, one conceived. Of the 57 patients with sterility of unknown cause, only one conceived. In these cases the husband's semen was used, and 25 patients were later inseminated with donor sperm with no successful results. Donor semen was used in the 4 cases of habitual abortion with no successes. The 2 cases inseminated with donor sperm to prevent hereditary disease were both successful.

(Artificial insemination is not the simple, glamorous procedure which is sometimes pictured by lay writers on "test-tube babies". As a matter of fact, to many gynecologists it is, as I have previously expressed myself in these pages, a rather disagreeable procedure, so that many of us prefer to refer such patients to the few enthusiasts who are likely to be found in every community of any size. Among its unpleasant aspects is the necessity of collecting a group of secret donors. Again, there are certain medico-legal connotations which make it an undesired type of practice to many gynecologists, who are likely to recommend adoption in most of the cases in which artificial insemination is recommended by the minority.

I have never been able to see the rationale of insemination using the husband's own semen, except in the rare cases in which there is a failure of intromission due to some such anomaly as a marked hypospadias. The poor results reported by Halbrecht in cases of this type are therefore not surprising.—Ed.)



## A CASE OF INTERSEXUALITY—A CLINICAL AND HORMONAL STUDY

A. M. HAIN AND J. E. SCHOFIELD

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J. Obst. &amp; Gynaec. Brit. Emp., 54: 97-101, 1947

A case of male pseudohermaphroditism in a 14 year old patient is described. When aged 2½ years, E. B. had a testicle removed at operation for right inguinal hernia, and at 14 years of age consulted one of the authors for hernia on the other side. The patient had been brought up as a girl and was unaware of any doubt as to her sex.

Examination revealed that the patient was 5 feet, 9 inches tall, had no axillary or pubic hair, some hair on forearms and legs. General body contour was of male type, flat breasts, inverted nipples, epiphyses not closed. The labiae were present but not well marked. The clitoris was the size of the red end of a match, urethra of female type, hymen poorly developed, vagina 1½ inches long, no cervix.

At operation, uterus, Fallopian tubes and ovaries were found to be completely absent. The testicle was removed. Histologically, the general appearance of the testicle was that of a cryptorchid rather than of adolescence. The few tubules present were lined with a single layer of germinal epithelium and there were large areas of denegeration. A third of the testis was connective tissue and there was a considerable amount of interstitial tissue.

The patient's daily hormone output prior to operation was: 17-ketosteroids, 11.9 and 6.7 mg.; pregnanediol, none; combined estrogen, 2 I.U.; gonadotrophin, 106 M.U. As the average adult male and female excrete respectively 13.3 and 7.4 mg. of 17-ketosteroids daily, the androgen excretion of this patient, in conjunction with the absence of pregnanediol excretion, ruled out the possibility of hyperplasia or tumor of the adrenal cortex.

The average gonadotrophin output for both sexes has been found to be between 5 and 20 M.U. per 24 hours. In women it may rise as high as 80 M.U. around ovulation; in men it rarely exceeds 40 M.U. The explanation for the excessive excretion of gonadotrophin in this patient lies in the fact that this patient was a cryptorchid. Experiments by Martins and Nelson suggested that castration, and to a minor degree cryptorchidism, so affected the pituitary that it produced a continuous and enhanced supply of follicle-stimulating hormone and little or no luteinizing hormone; parabiotic union of a normal female with a cryptorchid male caused the female to be in constant estrus. The striking observation in the present case is that a person only 14 years of age should have been excreting gonadotrophin in amounts typical for the adult castrate. The senior author ascertained gonadotrophic excretion in a number of children from 5 to 14 years of age. In 9 girls between the ages of 5 and 9 years the gonadotrophin output varied between

pattern the authors found that no positive relationship existed between the intensity of the vasomotor symptoms and the intensity of the emotional disturbances; nor was there any correlation between the incidence of headaches and lower back pain with the depressive reactions. However, a marked relationship was found to exist between pelvic discomfort of any type and emotional disturbance: 56 per cent of the "disturbed" patients and 26 per cent of the "mild" cases complained of lower abdominal pain. The authors considered this particularly significant, since no correlation whatsoever was found between the incidence of operation and the lower abdominal discomfort.

Up to the time of the publication of this report, the authors had determined estrogenic deficiency in only 13 patients. Thus far, no direct correlation between the degree of estrogenic deficiency and the emotional reaction is apparent. There does, however, seem to be a significant relationship between estrogenic deficiency and the intensity of hot flushes.

The characteristic features of a compound psychogram of all the patients were found to be coarctation, which is indicative of an inhibitory and relatively colorless type of psychiatric symptomatology, which, however, may have violent flare-ups, and an evasive manner of approach indicative of a basic insecurity. Thirty-three cases exhibited neurotic signs.

Considerably more of the cases of artificial menopause were found among the severely maladjusted women. In the majority of these cases, however, the injurious life situation preceded the artificial menopause. A qualitative descriptive study of these cases suggests that the patients reacted to psychological traumas with uterine dysfunction. From this it appears that the menopausal character of these depressive reactions is due to a conversion mechanism which has yet to be fully investigated.

From the total clinical picture encountered, the authors find that the overt psychiatric disturbance concomitant with the menopause has its roots in a maladjustment usually preceding the menopause. The menopausal depression presents a uniform clinical picture, which is found to be clearly distinguishable from other involutional disorders. Paranoid trends are conspicuously absent and the patient's premorbid personality differs essentially from that described as characteristic of involutional psychoses. The causes for the emotional reaction of the patient were chiefly associated with reproduction and marriage. The facts seem to suggest that the emotional background and menopausal symptoms come closer to being on an ideational and symbolic rather than on physiological level.

(Since the authors of this paper are psychiatrists, one is justified in concluding that this group of patients received a far more intensive psychiatric probing than menopausal women in general receive from their family doctors or gynecologists. It is not surprising, therefore, that the menopausal syndrome sounds so much more formidable than it usually appears to gynecologists, although a sifting out of the authors' psychiatric descriptions makes them seem somewhat less horrendous than might appear from the first reading of the paper. Perhaps it is a good thing that menopausal women are usually treated by general practitioners and gynecologists rather than by psychiatrists. One sentence of their paper which I heartily endorse is to the effect that "any overt psychiatric disturbance concomitant with the menopause has its roots in a maladjustment usually preceding the menopause".—Ed.)

A CANCER CONTROL PROJECT IN A PLANNED  
PARENTHOOD CENTER

EVELYN V. BERG

*Mineola, N. Y.**Nassau-Suffolk Planned Parenthood Center*

Human Fertil., 2: 75-78, 1946

In order to aid in the control of cancer of the uterus, a disease-finding program was instituted in a Planned Parenthood Center. Such an arrangement is believed to be feasible and requires no special effort on the part of the patients, since they already come to the Center for semi-annual check-ups. To date, 1350 women, between the ages of 17 and 50, have been examined and a report of the first 1000 cases is given in this paper.

Examination consists of a medical, gynecological and obstetrical history and a bimanual pelvic examination, including speculum examination in a good light.

In this group no cases of cancer were found on either the initial or subsequent visits. However, 525 women were found to have pelvic conditions requiring medical care. Of these, 469 had chronic inflammatory lesions of the cervix. Cases requiring medical care were referred to the family physician; 358 patients have been treated to date.

(When every gynecological examination becomes a cancer detection examination, a real advance will have been made. In addition to such mass educational campaigns as that of the American Cancer Society, an enormous amount of good can be done by individual doctors and gynecologists by spreading the gospel in their consulting rooms. Certainly a Planned Parenthood Center offers a fine opportunity, not only along the lines of cancer detection, but of cancer education and, for that matter, health instruction along many other lines.—Ed.)

## PELVIC EXAMINATION FOR NURSES

E. ALLEN AND CLARISSE GALLOWAY

*Chicago, Ill.**Presbyterian Hospital*

Am. J. Obst. &amp; Gynec., 53: 290-295, 1947

It is stated that routine complete physical examination of the adolescent girl for study and cure of disease offers one of the most important fields of preventive medicine today, and that hospitals and medical nursing schools should lead the way in this development.

■ The present report details the major and minor deviations from normal in the

2 and 10 M.U. daily, and in 8 boys aged 8 to 12 years the range was 2 to 18 M.U. daily. Since it is thus obvious that the anterior pituitary secretes gonadotrophin from an early age, it is not surprising that cryptorchidism in a child should have the same effect on pituitary function as that produced in an adult.

The probable origin of this developmental defect is discussed and the procedure to be adopted by the surgeon in such cases is debated. The authors believe that by retaining the testis in their case, there would have been not only the risk of its becoming secretory and giving rise to embarrassing symptoms of virilism, but also it might later have become the seat of a teratoma. This patient excreted very little urinary estrogen, and on this and on histological grounds, it was thought unlikely that the gland removed was secreting effective amounts of this hormone. 1 figure.

(This case, on the basis of the reported operative findings, would be classified as an instance of pseudohermaphroditismus masculinus externus. The proper classification of pseudohermaphrodites is not possible unless one is certain of the sex of the gonads, commonly based on biopsy. The external manifestations cannot always be used as a criterion. I have now under my care a case with external and genital characters quite like those described in the reported case, but the gonads are ovaries instead of testes. In other words, the body and genital tract characters may be almost identical whether the pseudohermaphrodite is genetically male or female.

One testis had been previously removed in this patient, and the other was removed at the operation reported above. This was probably unnecessary and perhaps unwise, as the retention of the testis does not keep up any continuing "contaminating" influence. In a male pseudohermaphrodite whom I observed some years ago, the psychology was typically feminine, with normal libido toward the male sex, and with a normal yearning for matrimony. It is of interest to note that in a number of reported cases of this type, living as women, removal of the testes has been followed by typical vasomotor symptoms similar to those produced by surgical castration in genetically normal females.

It is hoped that the authors of the above paper did not inform the patient of the sex character of the removed gonads, as this might have serious psychological effects. A cardinal rule in the management of pseudohermaphrodites, except perhaps some encountered in early childhood, is to make an effort to let them continue in the sex to which they had been consigned for many years, usually because of the character of the external generative organs. From the standpoint of the reconstructive plastic operations so often indicated, it is important to remember that it is technically far easier to adapt the sex apparatus to the female type than to the male, and this is what is called for in the majority of cases.

—Ed.)



pelvic organs and their physiology in 381 student nurses. Of these, 344 were between the ages of 17 and 22 years. Standards used to determine normal weight at the respective age levels were the usual ones followed in nutritional diseases, with a deviation of 6 pounds allowed on either side of normal. The series was divided into 6 groups, i.e., those of normal weight with normal and abnormal findings, those underweight with normal and abnormal findings, and those overweight with normal and abnormal findings. It was found that the number of entirely normal individuals was only 119 out of 381, or 32 per cent. There were about 3 times as many abnormal findings in the overweight and underweight groups as in those of the normal weight series.

Normal menstruation was found in 187 patients, dysmenorrhea in 78, menorrhagia in 83, oligomenorrhea in 64 and amenorrhea in 10. All of these amenorrheas have been corrected. The physical abnormalities discovered were: retroversion, 57 cases; infantile uterus or vagina, 31 cases; tight hymen, 45 cases, septate vagina, 1 case; vaginal cyst, 2 cases; congenital erosion, 64 cases; fibroids, 1 case; cervical polypi, 1 case; pelvic inflammation, 1 case; endometriosis, 16 cases; vaginitis (yeast), 5 cases; and trichomonas, 7 cases.

Many of the amenorrheas and oligomenorrheas fell in the group with lowered metabolism and were improved by thyroid and loss or gain in weight. In other cases clinical symptoms of thyroid insufficiency were present although the basal metabolic rate was normal, and these symptoms improved along with the menstrual disturbances with thyroid therapy.

The surgical procedures performed were: dilatation of hymen, 17 cases; hymenotomy, 2 cases; dilatation and curettement (for dysmenorrhea), 8 cases; dilatation and posterior colpotomy (endometriosis or ovarian cysts), 11 cases; removal of vaginal cysts, 1 case; laparotomy (endometriosis or chocolate cysts), 3 cases; cautery of cervix (of 77 cervical erosions), 41 cases. Patients with endometriosis were operated upon only when symptoms and palpatory findings were pronounced, or where progression was evident.



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than either of the blood levels involved, ranging from 3 to 10 times the fetal blood content. The placental level was also higher than that found in uterine muscle or umbilical cord, the levels in uterine sections ranging from 2.4 to 9.1 and those of umbilical cord tissue averaging 0.06 mg. per cent.

In vitro experiments with placental slices showed no evidence to indicate that the human placenta can synthesize ascorbic acid. The method of Smythe and King was used for this purpose, and in no case was there any evidence of an increase in vitamin C level in the withdrawn media, and a final assay of the placental tissue itself showed no increase in ascorbic acid.

Comparable assays of carotene, vitamin A and thiamin in the placenta, the maternal and fetal bloods gave results totally different from those obtained with vitamin C. The highest levels of carotene were found in the mother's blood, the lowest in the fetal blood, and the placental level fell between the two. Vitamin A was also found to be higher in the maternal than in the fetal blood, the placental level falling below the fetal blood in some cases and slightly above it in others. With thiamin the blood levels were approximately equal between mother and fetus, the cord blood being slightly lower and the placental levels being significantly lower. The relationship observed with ascorbic acid is apparently peculiar to that substance, and is not representative of the placental metabolism of all vitamins.

(There used to be much discussion as to whether the transmission of substances by the placenta occurs simply by physico-chemical diffusion, as through a collodion membrane, or whether the placenta possesses selective or vitalistic powers. A decade ago the evidence lay largely in favor of the diffusion theory because most simple substances then studied were found to be present in equal concentration, or approximately equal concentrations, on both sides of the placental barrier. Thus, urea, uric acid and creatinine levels were always found to be identical in the two circulations. It is true that amino acid nitrogen was regularly encountered in slightly higher concentration in the fetus and glucose at somewhat higher levels in the maternal blood, and that there were other discrepancies, but the differences were not great enough to demonstrate conclusively any selective activity. Accordingly, it was commonly taught at that time that substances with a molecular weight under 350 or so passed through the placenta by simple diffusion while blood constituents of much higher molecular weight did not pass at all.

When Braestrup of Copenhagen in 1937 (*Acta Paediatrica*, 19, Supp. I-II, 328, 1937) first demonstrated that vitamin C was always present in 2 to 3 times the concentration in the fetal circulation than in the maternal, and when other investigators had confirmed the fact, it became immediately apparent that here was a substance which violated all previous conceptions of placental transmission. Its molecular weight is small, namely 176 as compared with 180 for glucose; it resembles glucose closely in structural configuration; and certainly anyone with gambling proclivities would have bet heavily, before 1937, that vitamin C would behave identically as glucose does in respect to placental transmission. As explained above, however, its behavior is altogether different.

It is this enigma which has prompted the paper of Barnes above and that of Holzac and Barnes abstracted below, and gives them their interest and importance. By showing that the placenta does not synthesize vitamin C, Barnes has eliminated one possible solution of this puzzle and has added valuable evidence to the growing belief that the placenta exerts selective activity in respect to this vitamin. In the succeeding paper, the techniques of histochemical analysis are employed to show that the placenta conceals vitamin C in the syncytial layer of the chorionic villus,—a finding again in keeping with selective function.

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# Obstetrics

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## PHYSIOLOGY OF PREGNANCY, LABOR AND PUERPERIUM

### PLACENTAL METABOLISM OF VITAMIN C.

#### I. NORMAL PLACENTAL CONTENT

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Am. J. Obst. & Gynec., 53: 645-649, 1947

In an extensive study, Lund and Kimble formulated the tentative hypothesis that the placenta permits free maternal-fetal passage of ascorbic acid, while limiting fetal-maternal passage. The present study was undertaken to extend observations of the maternal-fetal plasma ascorbic acid relationship to whole blood, to correlate these levels with placental assays of vitamin C, to rule out the possibility of ascorbic acid synthesis by the placenta and to determine whether or not such selective retention is a nonspecific nutritional function of the placenta which applies to all vitamins.

More than 80 placentas were analyzed, preliminary assays being made to determine the loss incident to storage of the tissue or to delay in carrying out the extraction. Cord blood was usually collected prior to delivery of the placenta and maternal blood by venipuncture at the same time. Samples for uterine wall analysis were obtained at cesarean section and studied immediately. Three methods of vitamin C assay were used: whole blood determinations by the method of Roe and Kuether (also used for many of the placental studies); checking the placental analysis by the method of Mindlin and Butler; and, for further check on the placental levels, the direct titration method of Bessey and King. Carotene and vitamin A levels were determined by the method of Dann and Evelyn as modified by Kimble, and vitamin B analyses were made by the technique of Melnick-Field-Emmett.

The observation previously made that the ascorbic acid level in the fetal plasma is always higher than that in the maternal plasma was found to apply to whole blood determinations. Maternal venous whole blood levels ranged from 1.0 mg. per cent to 1.8 mg. per cent; fetal cord blood levels ranged from 1.2 mg. per cent to 2.48 mg. per cent, the latter always being greater than the corresponding maternal blood.

Placental levels expressed in milligrams per 100 Gm. of tissue ranged from 1.0; mean, 9.4. In each case the placental level was considerably higher

localization of ascorbic acid granules was noted in any of the placental tissues examined. 2 figures.

(See note appended to preceding abstract.—Ed.)

## TRANSFERENCE OF VITAMIN D FROM THE THE FEMALE RAT TO HER YOUNG

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*Nature, 159: 340-341, 1947*

In preparing rats for vitamin D test, the authors placed a stock colony on the Steenbock rachitogenic diet. However, it was found that neither the rats nor their young developed rickets, and it was subsequently discovered that the dried milk used in the preparation of the diet had been fortified by the manufacturers so that the rats were getting a higher than normal intake of vitamin D. This dried milk was replaced with unfortified dried milk, but successive litters of young rats developed no rickets at first, and only as time went on, developed at first a mild degree of rickets, than a more severe condition, and finally, after about 4 months, a state of rickets comparable with that produced by 3 weeks on the Steenbock diet in other rats.

From this study the authors conclude that the doe rat is able to store vitamin D, and that vitamin D was transferred to the litter, for succeeding litters developed rickets on the rachitogenic diet more rapidly when the female rat was again put on a vitamin deficient diet.

(This observation is in keeping with the fact that infants born of osteomalacic gravaide rarely show rickets. The leading authority on this subject, J. Preston Maxwell, spent a life time studying this disease in China and while he finally succeeded in discovering a few cases of fetal rickets, I believe he would agree with me that this is the exception rather than the rule.—Ed.)

## PLACENTAL HORMONES AFTER DEATH OF FOETUS WITH VIABLE PLACENTA

B. ZONDEK

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*Lancet, p. 178, Feb. 1, 1947*

The author presents 2 cases which demonstrate that a placenta can sometimes remain functional despite death of the fetus. Serum and urinary hormonal

These two papers report fundamental studies of the first order. It is gratifying to observe, moreover, that throughout the country the subject of placental transmission has awakened new interest and that various groups are attacking the problem not only with the latest chemical and histochemical techniques but also with the aid of tracer substances. All this presages much for our knowledge of this intriguing and versatile organ.—Ed.)

## PLACENTAL METABOLISM OF VITAMIN C.

### II. HISTOCHEMICAL ANALYSIS

J. H. HOLZAEFEL AND A. C. BARNES

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*Am. J. Obst. & Gynec., 53: 864-868, 1947*

The findings of Javert and Stander and of King imply an etiologic relationship between ascorbic acid levels and spontaneous abortion. Such a mechanism would presumably depend more on the vitamin concentration and (possibly) localization in the tissues involved, than simply on the levels in the maternal plasma. The present paper presents the histochemical determinations corollary to the gross analyses presented in a previous paper.

More than 500 placentas were examined in the course of establishing a suitable staining technique. A modification of the silver nitrate method for the microscopic localization of vitamin C in tissues was evolved and is presented by the authors. It is described as follows:

1. A 2 to 3 millimeter slice of fresh placental tissue is cut by frozen section.
2. The tissue is floated onto 5.4 per cent levulose for 10 minutes.
3. The tissue is placed in acidified silver nitrate solution and kept in the dark in an incubator at 56 degrees C. for 20 minutes.
4. The impregnated tissue is washed in distilled water for 15 to 20 minutes to remove the excess silver salts.
5. The silver stain is fixed in 5 per cent sodium thiosulfate for 30 minutes.
6. The tissue then is placed in absolute alcohol for 24 hours previous to embedding in paraffin and staining with hematoxylin-eosin.

The results of this study showed that the heaviest concentration of the ascorbic acid lies at the syncytial layer of the villi. There is some C in the central core of the mesodermal connective tissue, as evidenced by an even distribution of granules. However, the granules in this area are not as heavily deposited as at the syncytial layer. It was noted in all slides that the fetal portion of the placenta is richer in the vitamin than is the maternal portion.

The distribution revealed by these studies reflects the gradient of physiologic activity in the villus. Most of the metabolic function occurs at the syncytial layer, and in term placentas the principal evidences of degeneration and cytolysis lie in the center of the villi. No perinuclear aggregation or definite intra-cellular

Despite the fact that the curve shows this definite depression, the difference between the lowest at 8 months and the highest at 2 months is only 0.6 milligram. The author feels that the difference is sufficiently small to make its clinical importance very doubtful.

From the 110 "completed" cases, 20 with "short" labors (averaging 7 hours and 5 minutes) and 20 with "long" labors (averaging 28 hours and 35 minutes) were studied. The differences in serum calcium determinations between the cases of "long" labor and "short" labor were not sufficiently marked to be of any significance.

Forty-six cases in which the serum calcium determinations ran consistently above the average curve had an average blood loss of 213 cc. with an average labor of 15 hours and 57 minutes. Twenty-two cases in which the serum calcium determinations ran consistently below the average curve had an average blood loss of 157 cc. with an average labor of 18 hours and 27 minutes. These differences are considered not to be of any statistical value.

Nine cases developed toxemia and were eliminated from the study. It is interesting that the curve of serum calcium determinations in these patients was very bizarre, not conforming to the average curve presented in this paper. 4 figures.

(In addition to reporting his own findings Newman reviews the outstanding previous papers on this subject, and his graphs showing the various data constitute a valuable summation of the work which has been done on blood calcium in pregnancy. It is regrettable that these many fine studies have yielded so little of clinical importance. Theoretically (as discussed in the April issue of the Survey, pp. 183-184) there are several reasons to suspect that calcium plays an important role in uterine contractility, yet Newman finds no correlation between duration of labor and blood calcium levels, nor has any other investigator to my knowledge.—Ed.)

assays may be higher than in normal pregnancies because the entire output of placental hormones is taken up by the maternal circulation, none going to the fetus. In both of these cases the serum estrogen levels were high (up to 500 M.U./liter), even though there was clinical evidence of fetal death as early as 4 weeks before delivery.

From these observations, Zondek concludes that death of the fetus may be either primary, i.e., independent of the placenta, or secondary, due to death of the placenta. Whereas in secondary death of the fetus the hormone levels in the blood and urine fall rapidly, in primary death of the fetus there is no such immediate fall and the levels may even rise temporarily.

(I recall a few cases of fetal death in utero in which, 2 weeks or so after fetal exitus and with the infant still retained, profuse lactation suddenly started. These were presumably instances in which the placenta continued to manufacture estrogenic hormone for a number of days after fetal death. Then, apparently, placental activity ceased rather suddenly, with release of prolactin. The picture of lactation after fetal death in utero with the infant retained, is generally quite different from that following ordinary delivery. Thus, it is most unusual for lactational changes to develop suddenly and fully 3 or 4 days later; as a rule, there are no breast changes at all; and rarely, as in the above cases, they are greatly delayed. This general circumstance in itself suggests that the estrogenic hormone is often secreted by the placenta for some time after fetal death but perhaps in gradually diminishing amounts—Ed.)

## BLOOD CALCIUM: A NORMAL CURVE FOR PREGNANCY

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*Am. J. Obst. & Gynec., 53: 817-822, 1947*

This study is based on a series of 185 primiparas, 119 of which might be called "completed" cases, since they were studied throughout the entire course of pregnancy, labor and puerperium. In each case, blood was drawn at monthly intervals during pregnancy, once during labor and once in the immediate puerperium, not more than 14 days post partum. After the blood coagulated, the serum calcium was determined within a maximum period of 24 hours. The method used was the Clark-Collip modification of the Kramer-Tisdall method. Every effort was made to keep the results within the limit of error of 2 per cent. No effort was made to control the diet of the patients, other than the routine dietary instructions in this clinic.

The results indicate that there is a depression of the serum calcium during pregnancy which is most marked during the seventh and eighth months. It begins to rise at the ninth month, the elevation continuing through labor and almost reaching its early pregnancy level by the end of the immediate puerperium. The serum calcium begins to decrease as early as the second or third month.

that the excretion of sodium pregnanediol glucuronide by nonpregnant women is always below that excreted in early gestation. Unfortunately, the excretion of this substance during the luteal phase of the normal cycle seems to vary considerably from day to day and from woman to woman, depending on the functional activity of the corpus luteum in the particular cycle observed and upon metabolic and excretory factors. As noted by Morrow and Benua, moreover, in cycles prolonged by late ovulation the corpus luteum may be at the peak of functional activity at a time when the bleeding period is considered to have been missed (*Am. J. Obst. & Gynec.*, 51, 685, 1946). Hence, apparently, the large proportion of false positives reported by Reinhart and Barnes as well as by Morrow and Benua who found 19 positives in 49 specimens from 5 normal nonpregnant women. All this is regrettable because we do need very much a dependable chemical test for pregnancy.—Ed.)

### STANDARDISED RADIOLOGICAL PELVIMETRY. III. A NEW METHOD OF MEASURING THE OUTLET

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*Brit. J. Radiol.*, 20: 164-169, 1947

The pelvic outlet differs from the planes above it in the following respects: (1) It is not entirely a bony plane, being completed postero-laterally by the sacro-tuberous ligaments; and (2) It has 2 component parts, both triangular in shape and standing upon a common base, the intertuberous diameter. The anterior plane has as its apex the lower edge of the symphysis pubis, and as sides the ischiopubic rami. The posterior plane has as its apex the tip of the last fixed segment of the sacrum, and as its sides the sacro-tuberous ligaments.

Nicholson (1938) showed that the size of the subpubic angle was of significance in relation to the need for assistance during labor; he regarded 75 degrees as the critical value of the angle. Neither he nor Ince and Young could assign significance to any other feature of the outlet. The 2 planes of the outlet cannot be analysed independently because the characteristics of the one alter the functional significance of the other. It therefore seems necessary to develop some method of measurement of the outlet as a functional whole.

The determining factor as to whether delivery through the plane of the outlet is possible is the relationship of the tip of the sacrum to the sloping subpubic arch. If the tip lies close to the arch, the head may be prevented from passing far enough backwards to negotiate the arch. Conversely, in the case in which the arch is very narrow, no difficulty may arise if the sacrum is so far away as to have no real effect. The tip of the sacrum may be looked upon as the last obstacle between the head and freedom; its relation to the arch determines the effective free space available posteriorly.

As an aid to the examination of the 2 planes of the outlet as a functional whole, the author originally introduced his conception of the symphysis-biparietal

AN EVALUATION OF THE GUTERMAN PREGNANCY  
TEST IN CLINICAL PRACTICE

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J. Clin. Endocrinol., 6: 664-667, 1946

The Guterman test was applied to 130 patients in hospital and out-patient practice when a laboratory test for pregnancy was indicated. The test was employed as described by its sponsor, without modification, and the procedure was used routinely, avoiding a hand-picked "test-series" of cases.

Interpretations of color were checked in about one-third of the cases by photo-electric colorimeter. From this checking, the following conclusions were drawn: (1) There is a wide range of color in the final specimens. (2) No test which had been reported *positive* had a reading in the same range as the *negative* tests. (3) The experienced technician can read the presence of the color accurately, and does not represent an appreciable source of error (an error of zero in the tests checked).

Follow-up of each of the 130 cases was made not by other pregnancy tests, but by the clinical outcome of the case. Of the entire series, 71 patients were pregnant, and in these a *positive* test was obtained in 60 (84.5 per cent). Fifty-nine cases were not pregnant, and 30 of these (50.8 per cent) had *negative* tests. Included in the early cases were 9 patients who were having some vaginal bleeding, and in view of the statement that it requires a *positive* test plus amenorrhea to make a diagnosis, these cases must be ruled out. It must also be acknowledged that a test which is not accurate in the face of vaginal bleeding is of restricted value as a diagnostic aid in hospital practice. Of these 9 cases with bleeding, one was pregnant with *positive* test, one was not pregnant with *negative* test, and 7 were not pregnant with *positive* tests. It was found that 4 patients received progesterone therapy before the test specimen was collected; all had positive tests and 3 were pregnant. Eliminating the above-described cases, the percentage of pregnant cases with *positive* tests was 83.6 per cent; the percentage of cases not pregnant with *negative* tests was 58 per cent. To put it in a different way, given either a *positive* or a *negative* report by the laboratory, there is approximately a 25 per cent chance of error in diagnosis. It should also be noted that only one of the 11 pregnant patients with negative tests either aborted or threatened to abort.

It is concluded that the variations in pregnandiol metabolism make it doubtful that an analysis of its excretion will provide a clinically valuable pregnancy test.

(The Guterman test, which depends on the isolation from the urine of pregnanediol and its demonstration by a color reaction with sulphuric acid, is based on the premise, of course,



the author's graph, it is seen that there were both normal and abnormal labors associated with every angle between 65 and 100 degrees. This illustrates the defects of the subpubic angle as an index of prognosis.

The graph relating the course of labor with the symphysis-biparietal distance shows practically the same features. The critical level is 80 mm., but the sloping portion of the graph represents 288 (all but 9) of the 297 cases. Measurement of the symphysis biparietal distance is therefore of no more assistance.

The graph of the available posterior sagittal of the outlet is in great contrast. The critical level is 56 mm. In all 13 cases with diameters of 45 mm. or less, labor was abnormal; in all 194 cases with diameters 76 mm. or over, labor was normal. There are, therefore, 207 cases represented on the flat, horizontal parts of the graph, leaving only 90 on the sloping portion. One can say with reasonable certainty, in 70 cases in 100, that delivery through the outlet will either be normal or abnormal. In comparison, use of the subpubic angle allows a positive prognosis in only one case in 100, and the symphysis-biparietal distance gives the answer in only 3 cases in 100.

In this study, there was indication that some minor revisions of the dimensions of the transparency may be required. The author feels convinced that such modifications need only be minor, and that the concept of the available posterior sagittal diameter as a single measure of the outlet is sound. 7 figures.

(As indicated in the February issue of the Survey, pp. 8-10, outlet pelvimetry is undergoing an extensive metamorphosis and an important portion of the change is to be credited to the author of the above article who is Radiologist to the New Plymouth Hospital in New Zealand. It is he who introduced the concept of the symphysis-biparietal distance as the most reliable index of available outlet space and in this Thoms appears to agree (S. G. & O., 83, 399, 1946).

The modification of his method which Allen recommends in this article would seem a logical one and may best be visualized by making use of a dried pelvis together with a rod 103 mm. in length and a disc of the same diameter. The principle involved in his earlier method was to insert the rod transversely up into the angle formed by the pubic rami and to see how far it will go. With the rod held at this point the distance is measured between the mid-point of the rod and the undersurface of the symphysis. This is the symphysis-biparietal distance as measured, in effect, by his first method. In the technique described in the above article, the principle is to substitute the disc for the rod, measuring the distance from the center of the disc to the under surface of the symphysis. It is at once clear that the measurements would not necessarily be the same, depending on the configuration of the upper and middle parts of the pubic angle. For instance, if the pubic rami were not concave medially, the diameter of the disc could not be moved up as far as the rod, which assumes its place independent of any bony encroachment on the upper portion of the triangle. In his actual technique, of course, he places a transparency over the x-ray film in the form of a semicircle and scale, but the principle involved is the same as that described in the crude illustration just given.

Allen's figures make it plain that in his experience the posterior sagittal diameter of the outlet, or what Thoms calls the sacral-biparietal distance, is by far the most informative measurement in respect to outlet prognosis. This is understandable because this diameter is a function not only of posterior pelvic capacity but of the pubic angle since its forepoint shifts with the biparietal diameter, becoming larger as the disc can be pushed higher between the pubic rami.

The chief drawback to the technique lies in the special film of the outlet which has to be

distance. This measurement was designed to be a measure of the ability of the subpubic arch to transmit the head by indicating the minimum distance behind the symphysis at which the biparietal diameter of the skull could negotiate the arch. It was proposed that this distance could be measured directly upon an accurate film of the subpubic arch by means of a transparency. The design of this transparency has been altered so that it now consists of a semicircle of diameter 103 mm. which is intended to represent the anterior half of the presenting area of a fetal head 100 mm. in diameter, as it would appear slightly enlarged on the film. It has been assumed that the head presents as a circle when fully flexed, and that flexion is the rule. A scale is provided to allow direct measurement of the distance between the base line representing the biparietal diameter and the lower edge of the symphysis. The circumference of the semicircle is made to touch the inner sides of the ischio-pubic rami while the scale passes through the symphysis. The scale reads directly the symphysis-biparietal distance.

Theoretically, it can now be said what is the most anterior position at which the head can possibly negotiate the arch. The only remaining obstacle to delivery is the tip of the sacrum. It must now be decided whether delivery is possible by measuring the effective antero-posterior diameter remaining posteriorly. This diameter differs from the normal posterior sagittal in that the position of its anterior end-point varies with the symphysis-biparietal distance. This diameter is measured from the lateral film of the pelvis in the following manner. The symphysis-biparietal distance, previously determined, is enlarged by the correction factor appropriate to the lateral film. This enlarged distance is then set out on a compass, and with the centre at the lower edge of the symphysis, an arc is described in the region of the ischial tuberosities. The intersection of this arc on the inferior or posterior surfaces of the tuberosities is the anterior end-point of the posterior sagittal diameter. The distance from this point to the sacral tip is measured, corrected for divergent distortion in the usual way, and is then the available posterior sagittal diameter required.

The writer has available, as test material, 297 cases in which the outlet has been fully measured as described and in which the clinical course of labor is known. The cases have been classed as normal or abnormal labors at the level of the outlet. In addition, the abnormal cases have been weighted in the following manner. Cases in which delivery was impossible have been weighted 3, cases in which disproportion at the outlet could be overcome with the assistance of forceps have been weighted 2, and cases in which there was a suspicion of disproportion have been weighted 1. The percentage of abnormal labors weighted in this manner has been determined for each pelvic measurement.

The weighted percentage of abnormal labors was related to the size of the subpubic angle. As might be expected, the proportion of abnormal cases increased as the angle decreased. The percentage of abnormal deliveries was over 50 per cent for angles of 73 degrees or less, and under 50 per cent for angles of 74 degrees and over. The critical level might therefore be set at 73.5 degrees on these figures, in close agreement with Nicholson's 75 degrees. When examining

measurable; in others it was definite, but in no case did it amount to as much as 2 millimeters.

The small discrepancy referred to above in this measurement will become magnified the nearer the tube is to the pelvis. In Moir's work he uses a standard tube-film distance of 47 inches, and anything appreciably shorter than this is in his opinion undesirable. Heyns appears to use a distance of 40 inches, which may give a partial explanation of his different findings. In Moir's opinion another explanation is possible: Heyns may select, as the outline of the brim, the innermost margin of any bone outline seen on the film. This, however, would be unreasonable, for care must always be taken to identify the brim margin as it leaves the sacrum and to follow its curve as it crosses the bone mass of the ischium with its projecting spines.

(Chassar Moir has been one of our most assiduous and intelligent students of x-ray pelvimetry and it is reassuring to know that his investigation of this particular question seems to confirm the precision of x-ray mensuration of the inlet.—Ed.)

## MENINGITIS FOLLOWING CONTINUOUS CAUDAL ANESTHESIA

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*Am. J. Obst. & Gynec., 53: 682-683, 1947*

The author reports the case of a 23 year old gravida iii, para ii, who was admitted to the hospital 4 hours after the onset of premature labor. Temperature, pulse and respiratory rates were normal. Two hours after admission, caudal anesthesia by the catheter technique was begun. An initial test dose demonstrated the absence of spinal anesthesia and, therefore, the extradural position of the catheter. Complete dilatation was attained 7½ hours after admission and a living child was delivered by outlet forceps. Following delivery the temperature, blood pressure, pulse and respiratory rates were normal. The catheter remained in the caudal canal for 5½ hours, and the patient received 5 instillations, totaling 100 cc. of 1.5 per cent metycaine solution.

Clinical signs and symptoms of acute meningitis developed 24 hours after cessation of caudal anesthesia. No evidence of infectious focus could be demonstrated elsewhere in the body. Penicillin and sulfadiazine therapy were instituted and the cerebrospinal fluid was normal 6 days after the onset of the illness. The patient was entirely well at discharge on the tenth postpartum day.

The spinal fluid of 3 selected normal patients, each carried for more than 6 hours on continuous caudal anesthesia, was found to be grossly and microscopically normal. This suggests that neither metycaine nor the plastic catheter was irritating to the meninges of these 3 patients.

taken. Not only does this mean additional expense, but technical difficulties are considerable and Allen himself is not certain that he can circumvent all of them. As I understand it, this film is taken as follows: "the patient is placed straddling a cassette; she is made to stoop forward till the under surface of the symphysis pubis and the ischial tuberosities are equidistant from the film, i.e., the pubic arch is now horizontal. The tube is centered above or slightly posterior to the ischial tuberosities."—Ed.)

## A COMMENT ON A RECENT CRITICISM OF BRIM PELVIMETRY

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J. Obst. & Gynaec. Brit. Emp., 53: 496-497, 1946

This article has to do with a recent paper on x-ray measurements of the pelvic brim by O. S. Heyns (Brit. J. Radiol., 20, 31-33, 1947; abstracted in Obstetrical & Gynecological Survey, 2, 350-351, 1947—June issue). Heyns carried out x-ray pelvimetry on 20 Bantu dry pelves forming a random sample of a larger series with a mean brim index of  $90.35 \pm 1.0$ . The mean index of the 20 pelves was 21.51. However, the mean index of these 20 pelves as calculated from radiographic data was 98.60. It was shown that the random sample allows valid conclusions to be drawn, because its distribution over the Caldwell and Moley parent types of pelvis is similar to that in a larger series. The plus error for the x-ray index was due mainly in Heyns' opinion to the fact that its denominator must always be decreased, because the rim of bone shown on the film in the iliac region of the inlet always lies medial to the true ilio-pectineal line.

If Heyns' contention is correct it makes the radiographic measurement of the important transverse diameter a highly uncertain procedure. The present comment of Moir is in answer to this criticism of brim pelvimetry.

In Moir's early experimental work he compared the results of stereoscopic pelvimetry with isometric pelvimetry and became aware of the fallacy which Heyns now stresses. He was, however, satisfied that the difference between the transverse diameter as shown in superior-inferior projection and the transverse diameter found on actual measurement of the dried pelvis was too small to be of practical importance. In view of Heyns' findings it seemed desirable to Moir to investigate this matter afresh. Using all the dried pelves available to him (8) he attached a series of lead shot around the anatomical brim and photographed the pelvis according to the method he usually employs (J. Obst. & Gynaec., 53, 487-497, 1946; abstracted in Obstetrical & Gynecological Survey, 2, 350, 1947). The difference between the transverse measurement as determined by the position of the shot, and the transverse measurement as determined by the radiographic appearance of the brim margin was in some cases barely

measurable; in others it was definite, but in no case did it amount to as much as 2 millimeters.

The small discrepancy referred to above in this measurement will become manifested the nearer the tube is to the pelvis. In Moir's work he uses a standard tube-film distance of 47 inches, and anything appreciably shorter than this is in his opinion undesirable. Heyns appears to use a distance of 40 inches, which may give a partial explanation of his different findings. In Moir's opinion another explanation is possible: Heyns may select, as the outline of the brim, the innermost margin of any bone outline seen on the film. This, however, would be unreasonable, for care must always be taken to identify the brim margin as it leaves the sacrum and to follow its curve as it crosses the bone mass of the ischium with its projecting spines.

(Chassar Moir has been one of our most assiduous and intelligent students of x-ray pelvimetry and it is reassuring to know that his investigation of this particular question seems to confirm the precision of x-ray mensuration of the inlet.—Ed.)

## MENINGITIS FOLLOWING CONTINUOUS CAUDAL ANESTHESIA

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*Am. J. Obst. & Gynec., 53: 682-683, 1947*

The author reports the case of a 23 year old gravida iii, para ii, who was admitted to the hospital 4 hours after the onset of premature labor. Temperature, pulse and respiratory rates were normal. Two hours after admission, caudal anesthesia by the catheter technique was begun. An initial test dose demonstrated the absence of spinal anesthesia and, therefore, the extradural position of the catheter. Complete dilatation was attained  $7\frac{1}{4}$  hours after admission and a living child was delivered by outlet forceps. Following delivery the temperature, blood pressure, pulse and respiratory rates were normal. The catheter remained in the caudal canal for  $5\frac{3}{4}$  hours, and the patient received 5 instillations, totaling 100 cc. of 1.5 per cent metycaine solution.

Clinical signs and symptoms of acute meningitis developed 24 hours after cessation of caudal anesthesia. No evidence of infectious focus could be demonstrated elsewhere in the body. Penicillin and sulfadiazine therapy were instituted and the cerebrospinal fluid was normal 6 days after the onset of the illness. The patient was entirely well at discharge on the tenth postpartum day.

The spinal fluid of 3 selected normal patients, each carried for more than 6 hours on continuous caudal anesthesia, was found to be grossly and microscopically normal. This suggests that neither metycaine nor the plastic catheter was irritating to the meninges of these 3 patients.

The possibility that the present patient entered the hospital during the incubation stage of meningitis cannot be denied, although she seemed normal on admission and no focus of infection was found elsewhere in the body. There has been evidence that meningitis can follow caudal anesthesia, Manalan having reported a case.

## MINIMAL SPINAL ANESTHESIA IN VAGINAL DELIVERY; AN ANALYSIS OF 1,000 CONSECUTIVE CASES

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AND

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*Am. J. Obst. & Gynec., 53: 805-811, 1947*

One thousand cases delivered under "minimal dose spinal anesthesia" are reported in this paper. There were 1,008 deliveries, there being 8 sets of twins. This method of anesthesia proved to be a safe and desirable one for operative vaginal delivery, and the results indicate that it deserves a place in the obstetrician's armamentarium for use in selected cases.

Metycaine, 22.5 mg. (1.5 cc. of a 1.5 per cent solution), was found to be the minimal practical dose, and was used in every instance in the series herein presented. The injection was made, with few exceptions, when the patient was ready for delivery. In primiparas the cervix was completely dilated, and in most instances the head on the perineum; many multiparas were intentionally given their injections before complete dilatation. Anesthesia lasts about 60 to 90 minutes. The skin is prepared with soap, ether and tincture of merthiolate. The first lumbar interspace is chosen as being anatomically and physiologically correct because pain fibers from the uterus enter the spinal canal at the level of the eleventh and twelfth thoracic nerves. After infiltration of the skin and subcutaneous tissues, a No. 22-gauge short beveled needle is inserted into the spinal canal. At the first appearance of a crystal clear "bead" at the needle's hub, 1.5 cc. of metycaine is injected slowly, between uterine contractions. The patient is turned on her back and the head of the delivery table is raised about 20 degrees for 10 minutes.

With this technique, anesthesia usually reaches a level between the umbilicus and the xyphoid. There is no obliteration of uterine motor activity. Anesthesia is complete in 15 minutes.

Of the 1000 cases, 652 (65.2 per cent) were primiparas, and 348 (34.8 per cent)

were multiparas. Of the total, 224 (22.4 per cent) delivered spontaneously; 776 (77.6 per cent) were operative deliveries. The operative incidence was 88.96 per cent among primiparas and 56.32 per cent among multiparas. Episiotomy followed by outlet forceps was practiced, but spontaneous delivery was encouraged where easy prompt outcome was anticipated.

A perineal anesthesia failure occurred in 53 cases (5.3 per cent), and of these, 51 (5.1 per cent of the total 1000 cases) required supplemental anesthesia. There were 3 instances of complete failure to relieve discomfort from uterine contractions (0.3 per cent), and 31 (3.1 per cent) had only partial relief from uterine pain.

The average drop in blood pressure in the entire series was 14 mm. Hg systolic, and 7 mm. Hg diastolic. There were no instances of shock in the entire series. There were no instances of nausea attributable to the injection.

The average blood loss was very close to 100 cc., definitely lower than in cases where inhalation anesthesia was employed. There were 11 cases (1.1 per cent) of postpartum hemorrhage (blood loss of over 500 cc.). All responded without incident to intravenous ergotrate and blood replacement therapy.

There were 43 morbid patients (temperature of 100.4 degrees F. occurring on 2 or more days, not including the day of delivery). There were 15 cases (1.5 per cent) of urinary retention; in all except 3 some obvious complication was present to explain faulty bladder dynamics. There were no instances of infection at the site of injection, no meningeal infections and no neurological sequelae.

A total of 72 patients (7.2 per cent) complained of headache in the postpartum period. In 9 instances (0.9 per cent) other obvious causes for headache were found, giving a corrected incidence of 63 cases (6.3 per cent) of postspinal headache. These originated in the first 24 to 48 hours, and lasted from one to 10 days. No means, save repeated doses of codeine and the supine position, served to ameliorate this distress. In many mild cases it is thought that the element of suggestion plays a part.

There were 18 infant deaths (1.8 per cent) in this series. None of these deaths was attributable to the anesthesia, so the corrected fetal mortality was 0 per cent.

## COMBINED EVIPAL AND SCOPOLAMINE ANALGESIA AND CYCLOPROPANE ANESTHESIA IN OBSTETRICS

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*Am. J. Obst. & Gynec., 53: 758-765, 1947*

Seven hundred private obstetric cases comprise the subject of this report, wherein evipal soluble was used rectally and scopolamine hydrobromide hypo-

dermically, combined with cyclopropane anesthesia. This combination was found to be safe and effective.

The proper time for the administration of analgesia was determined by the following criteria: (1) when it was definitely ascertained that the patient was in true labor; (2) when she began to complain of pain and ask for relief; and (3) after the cervix showed effacement and 3 or more centimeters of dilatation. Evipal soluble crystals ( $1\frac{1}{2}$  Gm.) were dissolved in 60 cc. of tap water and allowed to flow by gravity through a soft rubber catheter into the rectum, after which the buttocks were pressed together for about 10 minutes and a digital rectal examination was not done for at least 30 minutes. Scopolamine hydrobromide ( $1\frac{1}{30}$  grain) was given hypodermically at about the same time as the evipal instillation. An additional injection of scopolamine ( $\frac{1}{30}$  grain) was given one hour after the first injection or later during labor, if necessary. In only 25 per cent of the cases was this considered necessary. Cyclopropane, given by inhalation for anesthesia, was not employed until the presenting part caused perineal signs denoting imminent delivery, and then only after the patient had been transported to the delivery room.

Complete analgesia and amnesia during labor were experienced by 93 per cent of the patients in this series. They all volunteered that they remembered nothing about their labor after rectal instillation of evipal. The average patient slept from  $1\frac{1}{2}$  to 2 hours after delivery. Seven per cent of the patients received only fair sedation, and some remembered almost everything about their labor until the time of administration of cyclopropane. The majority of these patients had been given castor oil for induction of labor; since then, castor oil has been eliminated for induction and no failure to produce good amnesia has been encountered. In primiparas, the average length of labor was 11 hours, 39 minutes; in multiparas, 9 hours, 41 minutes. Only 5 per cent of the patients became difficult to manage while under sedation. This is an improvement over results with most barbiturate-scopolamine combinations.

Cyclopropane is especially adapted for obstetrics because its anesthetic action is rapid and because its high oxygen content lessens fetal and maternal respiratory complications. It is highly inflammable and should be administered by a trained anesthetist only after all precautions have been taken to prevent explosions. The face piece is secured over the nose and mouth and the patient is given a few inhalations of 100 per cent oxygen before this concentration is diluted with 50 per cent cyclopropane. As unconsciousness ensues, the mixture may be reduced to 10 to 15 per cent cyclopropane and 85 per cent oxygen. With effective evipal-scopolamine analgesia, the mixture of cyclopropane may be reduced to as little as 3 to 5 per cent. The oxygen content is raised after birth of the baby until the umbilical cord is severed. If perineal repair is necessary, the concentration of cyclopropane may be raised to 15 to 20 per cent.

Four stillbirths were reported in this series. The cause of each was ascertained, and in no instance did the agents used for the production of analgesia and anesthesia have the remotest connection with etiology of fetal death. No actual fetal asphyxia was encountered. Less than 7 per cent of newborn babies



required artificial resuscitation. All of these survived with no further trouble after resuscitation.

Cervical lacerations in all cases amounted to 4 per cent, and were repaired immediately following delivery, whether actually bleeding or not. This small incidence of laceration speaks well for the relaxing effect of evipal and scopolamine upon the cervical muscle fibers.

Low (perineal) forceps were applied in 312 cases, or 44 per cent. Of these, 212 were primiparas and 100 were multiparas. Midpelvic application of forceps occurred in 47 cases, or 6 per cent.

It is concluded that the combination of evipal and scopolamine analgesic medication is useful in any hospital sufficiently staffed to carry out the simple technique outlined in this report. The use of these drugs does not increase the need for additional nursing care over any other form of analgesia.

## DELAYED LIGATION OF THE UMBILICAL CORD

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Pennsylvania M. J., 50: 726-728, 1947

Delayed ligation of the umbilical cord is recommended by the author because it results in a higher hemoglobin and red count in the first week of life, an increased corpuscular hemoglobin in the infant of 8 to 10 months of age, a possible aid in decreasing the prothrombin time, a valuable means of providing increased blood volume following difficult deliveries, and a significant contribution to the welfare of premature infants.

Delayed ligation of the umbilical cord until the cord has definitely ceased all pulsation results in an average of 96 cc. of added blood to the newborn infant as determined by increased weight. The author's series consisted of 135 cases of about equal numbers of primiparas and multiparas with vertex presentations. Except for one cesarean section, all patients were delivered either spontaneously or by prophylactic low forceps. In each case the mother was given intravenous ergotrate with delivery of the anterior shoulder, resulting in prompt delivery of the placenta. A first group of 30 infants were delivered directly onto the scales where the cord was ligated and cut and the baby weighed. These babies were reweighed 30 to 40 minutes later. It was found that the weight change during this period was negligible if discrepancies due to loss of vomitus, urine, meconium and vernix were controlled. The second group of 30 infants were delivered directly onto the scales and weighed immediately. The cord was not ligated. The baby with the attached placenta at the same level was placed in a bassinet, and care was taken to see that there were no kinks in the cord nor undue pressure upon it. After the cord had stopped pulsating, it was ligated and cut. Re-

weighing of the baby at this time revealed that the infant had accumulated from 37 to 187 cc. of blood with an average of 96 cc.

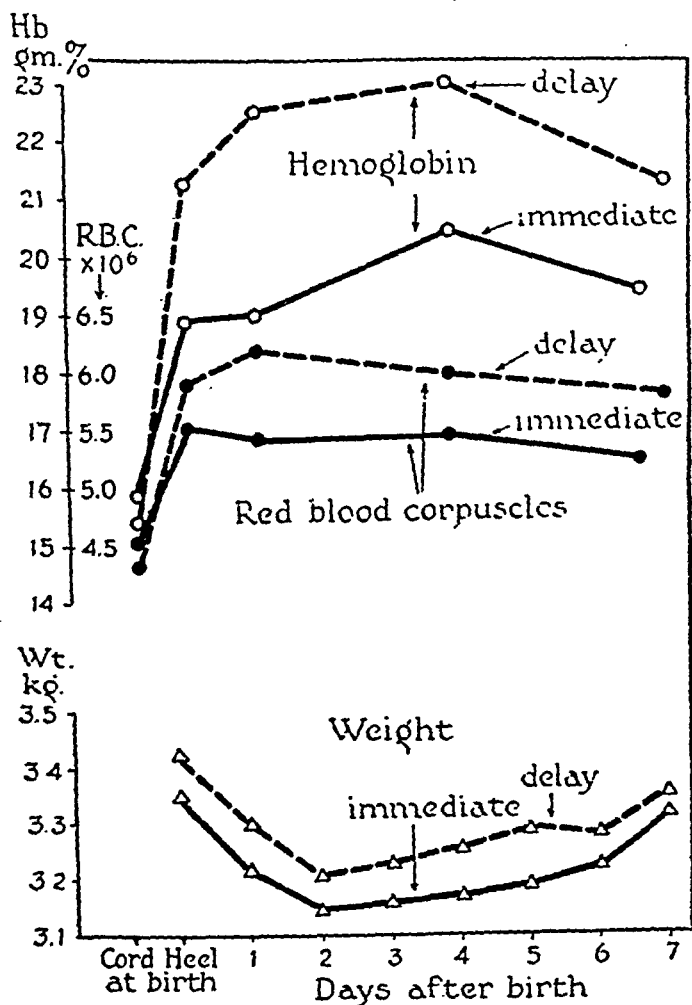


FIG. 1. Graphic reproduction of the average number of red corpuscles, amount of hemoglobin and body weight of infants from birth to the 7th day. Solid lines connect values for infants whose cords were clamped immediately; broken lines, the values after delayed clamping. (DeMarsh, Alt, Windle and Hillis.)

There appeared to be no correlation between the weight of the baby, the length of the cord, and the amount of blood gained. Furthermore, there appeared to be no correlation between the volume of blood accumulated and the length of time the cord continued to pulsate. The average length of time during which the cord continued to pulsate was 21.7 minutes.

A third group of 30 infants was treated in the same manner as the second group,

except that the placenta was elevated as high above the infant as the length of the cord allowed. This did not increase the volume of blood made available to the infant.

The use of intravenous ergotrate with an accompanying shortening of the third stage does not appreciably change the volume of blood obtained by the baby.

(This article is a convincing and timely reminder of an old and important teaching, namely: whenever possible, defer clamping or ligating the cord until its pulsations wane. There has been a tendency of late, for a number of reasons, to ignore this precept. In the first place, the widespread use of analgesic drugs in labor has resulted in a goodly number of infants whose respiratory efforts are sluggish at birth and whom the obstetrician wishes to turn over immediately to an assistant for aspiration of mucus and, if necessary, resuscitation. This readily leads to the habit of clamping all cords promptly. Secondly, there is the episiotomy wound to suture; and the quicker the repair is started, the shorter will be

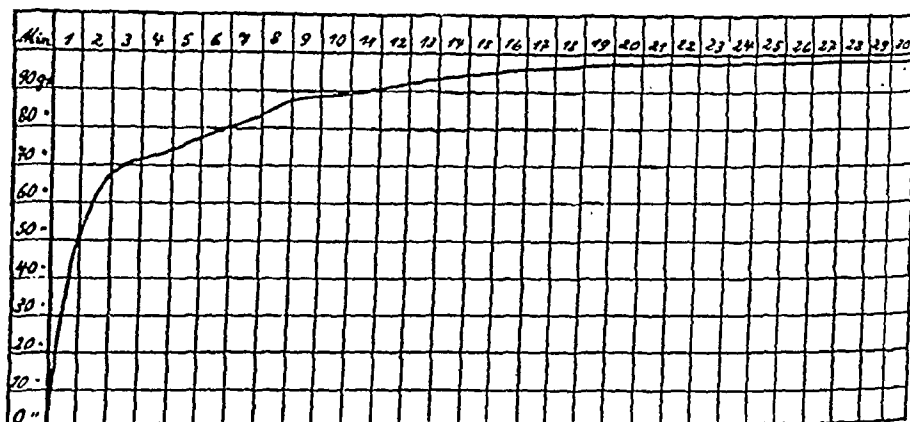


FIG. 2. Average weight of blood transferred from placenta to infant after birth according to minutes elapsing. (Haselhorst and Allmeling.)

the duration of anesthesia, the less the blood loss from the wound, etc. Finally, modern management of the third stage, especially if ergonovine has been given with the birth of the anterior shoulder, calls for immediate attention to the uterus and furnishes another reason for handing over the baby to an assistant or nurse as promptly as possible. These three tendencies of modern obstetrics, then, notwithstanding their several merits, do militate against delayed clamping of the cord. As a result, two questions arise: How important is this additional blood to the infant? How can the possible advantages to the baby of late clamping be secured in the presence of these interfering techniques?

The benefits which accrue to the baby from delayed ligation of the cord probably contribute more to his welfare during the neonatal period than has been realized. This fact has been stressed by many authors but most cogently perhaps by the well documented studies of DeMarsh, Alt, Windle and Hillis, working at the Cook County Hospital. Their first study (J. A. M. A., 116, 2568, 1941) dealt with the effect of depriving the infant of its placental blood on the hematological picture during the first week of life. Their findings are summarized in Fig. 1, where it may be seen that the hemoglobin concentration, the red cell count and the body weight were, on the average, decidedly higher in infants whose cords were clamped late rather than immediately. These authors found also higher reticu-

locyte counts in infants whose cords were clamped immediately, a circumstance suggesting a greater demand for blood in this group than in the group whose cords were not clamped until placental separation. A subsequent paper had to do with the blood volume of the newborn infant in relation to early and late clamping of the umbilical cord (*Am. J. Dis. Child.*, 63, 1123, 1942). Here it was found that the deprivation of blood which the newborn suffers from immediate cord clamping averages 107 cc.,—a figure in good agreement with the 96 cc. cited by Ballentine above. Moreover, while the average blood volume of infants allowed to retrieve this placental blood (delayed clamping) was 361 cc., it was only 301 when immediate clamping of the cord had been practiced, a difference equal to one-sixth of the total blood volume of the newborn infant.

As shown by the figures cited above the quantity of blood received by the newborn infant from the placenta (96–107 cc.) looms tremendously large in relation to its total blood volume (about 360 cc.) and must have, one would think, an important bearing on bodily economy during the neonatal period. For the premature infant this additional blood is especially important for 2 reasons: (1) since the placenta is larger in relation to body size than in the mature baby, the quantity of the transfusion is greater in relation to the infant's blood volume; (2) since premature babies are prone to develop anemia, they need all this blood they can get. The need of the mature infant for this additional blood is of course less urgent; but in view of Fig. 1, and since this physiologic transfusion is part and parcel of the natural birth process, it is to be regarded as desirable unless it can be proved otherwise.

In regard to the practical difficulties associated with delayed clamping of the cord as mentioned above, these disappear in large measure if consideration is given to the rate at which blood is transfused from placenta to infant after birth. This question was carefully studied in 1930 by two German investigators, Haselhorst and Allmeling (*Zeitschrift. f. Geburts. u. Gynäk.*, 98, 103, 1930). These workers placed 120 newborn infants on special spring scales immediately after delivery and observed their weight gain from minute to minute. The results are graphed in Fig. 2. The total weight gain, about 90 gr., is in good agreement with the figures cited above. Most important, however, from a practical viewpoint is the fact that over half this weight of blood is transferred the first minute and about three-quarters within the first two minutes. After about three minutes the strong pulsations cease and thereafter the amount of blood transferred is a rather small fraction of the whole. From the viewpoint of the objective to be attained, therefore, delayed clamping or ligation of the cord might very sensibly be defined as postponement of this procedure for two to three minutes. Even a delay of one minute will give the infant over the half of the blood it is supposed to receive. This latter period should not interfere appreciably with the techniques discussed above, but here, as always, common sense has to be employed and iron-clad rules are undesirable.—Ed.)

## PATHOLOGY OF PREGNANCY

### RIBOFLAVIN DEFICIENCY IN PREGNANCY; ITS RELATION TO THE COURSE OF PREGNANCY AND THE CONDITION OF THE FETUS

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During the past few years considerable attention has been paid to the relation between prenatal malnutrition on the one hand and the complications of pregnancy, labor and the puerperium and the condition of the fetus at birth on the other hand. In these studies it has been shown that pregnancy in women on poor diets is frequently accompanied by obstetrical complications, such as miscarriages, stillbirths and premature deliveries. During the war years in Palestine an opportunity to study the clinical syndrome of riboflavin deficiency arose. This deficiency was especially frequent in pregnant women, and its peculiar clinical manifestations were described in a previous paper by the present authors (Am. J. Obst. & Gynec., 52, 43, 1945). Generally the ariboflavinosis in these women was not accompanied by other deficiency diseases. Furthermore, close relationship was demonstrated between the riboflavin content of the diet, the clinical syndrome and the riboflavin excretion in the urine.

In the present paper the effect of riboflavin deficiency on the course of pregnancy and parturition, as well as upon the condition of the fetus at birth and its further development, is reported. The diagnosis of riboflavin deficiency in this study was based mainly on the amount of riboflavin excreted in the urine. Three hundred and twenty-six women attending the prenatal clinic of the Rothschild-Hadassah University Hospital were studied. In this series the amount of riboflavin in the morning urine was examined twice monthly and at least 6 times throughout pregnancy. According to the average amount of riboflavin excreted in the morning urine, this series was divided into 4 groups:

Group A, up to 100 grams per litre . . . . .	60 cases
Group B, 100 grams to 200 grams per litre . . . . .	62 cases
Group C, 200 grams to 300 grams per litre . . . . .	123 cases
Group D, more than 300 grams per litre . . . . .	81 cases

325 cases

Two hundred and fifty to 500 grams of riboflavin per litre of urine should be considered as the average amount excreted by normal individuals in Palestine.

In the 4 groups the influence of riboflavin deficiency on the course of pregnancy, labor and the postpartum period, lactation, fetal and neonatal mortality and the condition of the fetus at birth and its subsequent development, was investigated. The authors were not able to observe any effect of riboflavin deficiency on the frequency of toxemia, infections and hemorrhagic complications, although numerous authors have emphasized the high incidence of these complications in various nutritional deficiencies. Nor did they find that riboflavin deficiency in the mothers exerted any harmful effect on the birth weight of the infants or their future development. On the other hand, vomiting was definitely prevalent in the groups with low urinary riboflavin excretion, probably because of anatomical changes in the upper digestive tract which accompanied the deficiency state.

A significant relationship was found to exist between riboflavin deficiency and the incidence of prematurity. The average incidence of premature deliveries in the groups with low riboflavin excretion was 14.6 per cent, while in the 2 remaining groups it was only 5.5 per cent. Very significant results were also obtained regarding the incidence of stillbirth due to antenatal death of the fetus. In the first 2 groups antenatal death occurred in 4.9 per cent of the cases, while in the other groups there was none at all. It appears also that riboflavin deficiency has a harmful effect on lactation. In Group A 33.3 per cent of the cases had hypogalactia and in 6.6 per cent there was complete agalactia. In Group B 25.5 per cent had hypogalactia while in Group C and Group D an average of only 5.9 per cent was noted.

## A STUDY OF THE INTER-ACTION OF PREGNANCY AND HYPERTENSIVE DISEASE

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*Am. J. Obst. & Gynec., 53: 851-863, 1947*

From the opening of this hospital in October, 1931, through 1944, the authors have seen 218 patients in 301 pregnancies classifiable as hypertensive toxemia. Only those cases have been taken in whom (a) hypertension was known to have existed before pregnancy, or (b) hypertension was found before the twenty-fourth week of gestation, no previous normal readings having been recorded during pregnancy. The authors' standard for hypertension is 140/90 or greater.

Every patient was traced to late 1945 or early 1946. Of the 218, 39 are dead, 5 refused examination, and 178 were re-examined (4 have died since re-examination). At follow-up, the blood pressure was determined, the eyegrounds examined, palpatory estimation was made of the state of the radial arteries, and the heart was auscultated. Cardiac size was determined by x-ray. The morning

urine was examined for protein, sugar, specific gravity, and formed elements. Blood chemical determinations included sugar, nonprotein nitrogen and urea.

A summary of an analysis of the 301 pregnancies which was previously reported is presented. Nearly 40 per cent of the patients showed significant drops in the midpregnancy blood pressure. Near delivery, the blood pressure was increased over the initial levels in 30 per cent of cases. The outstanding hazard of pregnancy is the superimposition of toxemia, which occurred in about 30 per cent. The incidence of eclampsia in these hypertensives was 10 times that in all patients, while the incidence of pre-eclampsia was increased 7 times. The authors could find no satisfactory criteria by which to judge the likelihood of toxemia occurring. There were 6 immediate maternal mortalities, 4 of which occurred in the first hypertensive pregnancy, and 2 in subsequent pregnancies. In addition, 7 women died within the first 4 months post partum. These 13 deaths give a maternal mortality rate of 4.3 per cent, or 20 times that for all patients in this clinic. Eight of the 13 deaths were attributable to hypertensive disease. The gross fetal mortality was 38.2 per cent. In earlier pregnancies, the fetal loss had been 34.7 per cent, and in subsequent pregnancies, it was 40.2 per cent. The fetal mortality increased with increasing severity of the hypertension, with the appearance of proteinuria, with renal impairment, and especially with the superimposition of pre-eclampsia or eclampsia.

These data establish the dangers of pregnancy itself—one woman in 23 died and 2 in 5 lost their babies. Yet the majority of hypertensive women apparently are not jeopardized by pregnancy; two-thirds of these patients escaped superimposed toxemia. The follow-up findings to be presented indicate that repeated pregnancies are not remotely harmful to hypertensive women unless pre-eclampsia or eclampsia supervene.

The length of follow-up averaged almost exactly 7 years. Included in the 39 deaths (17.9 per cent) are the 6 immediate and 7 late puerperal deaths. Two of the immediate deaths are considered as remote because they were associated with subsequent pregnancies, and all of the late puerperal deaths are considered as remote. This makes 35 remote and 4 immediate fatalities. Of the 82 patients who had superimposed toxemia in 90 pregnancies, 31.7 per cent are dead. In contrast, of the 136 patients who did not have superimposed toxemia, 9.6 per cent are dead. The annual remote death rates were, respectively, 43.25 and 14.24 per thousand. Thus, the annual death rate of the 214 survivors was 24.62 per thousand, which is 6 times the expected rate for unselected women of the same age, color and calendar year distribution.

The patients were divided into 3 groups: (1) those who have had no pregnancy subsequent to the one in which the diagnosis of hypertensive disease was established; (2) those who had one later pregnancy; and (3) those who had 2 or more pregnancies. It was found that *the annual death rate was not affected by repeated pregnancies, even with the risk of superimposed toxemia in the later pregnancies.* A separate analysis of patients with and without superimposed toxemia shows no significant differences in annual death rates for those who did and those who did not have pregnancies after the one in which the hypertensive disease was diag-

nosed. In those women with initial blood pressures of 200 or higher, repeated pregnancies were associated with a somewhat lower death rate than was found in patients having no later pregnancy, although the cases are too few to permit any definite conclusion. In the milder hypertensives, repeated pregnancy was associated with a slightly increased death rate.

At follow-up, 26, or 11.9 per cent of the patients had either a systolic pressure of less than 140 mm. Hg, or a diastolic pressure of less than 90 mm. Hg, or both. Of 125 patients who did not have superimposed toxemia, only 8.0 per cent had systolic pressures of 220 mm. Hg or higher at follow-up. Of the 74 patients who did have superimposed toxemia, 24.3 per cent had systolic pressures of 220 or greater. This difference is significant. In patients who did not have toxemia, 30.6 per cent had greater hypertension at follow-up than when originally observed, while in those who did not have superimposed toxemia, 46.1 per cent had increased hypertension. There are only 3 chances in 100 that this is not a real difference. As perhaps might be expected, a larger proportion (68 per cent) of mild hypertensives became worse following superimposed toxemia (as judged by the blood pressure level). When the patients began with a severe hypertension, only 31 per cent became worse.

The voided urines of 194 patients were examined at follow-up. In 83.6 per cent, protein was negative or present in only a "very faint trace." Sixteen urines showed a possibly significant trace of protein, and 16 had 1 Gm. or more per liter.

In 72, or 37.1 per cent, the urinary specific gravity was 1.022 or higher in casual urines. Urea clearances were done in 81 of the 122 patients whose urinary specific gravity was less than 1.022. There were only 14 clearances below 70 per cent.

Of the patients whose renal function was estimated, 96 per cent were normal.

There were 127 pregnancies in 82 patients, subsequent to the one in which hypertensive disease was diagnosed. The fetal loss in these later pregnancies was 40.2 per cent. In the 83 later pregnancies seen by the authors, the recurrence rate of superimposed toxemia was 64 per cent. In pregnancies following non-toxic gestations, the incidence of superimposed toxemia was 25.4 per cent.

The outstanding conclusion from this study is that repeated pregnancies are not demonstrably harmful to the hypertensive woman. The pregnancy itself is hazardous should toxemia occur. Such superimposition of toxemia does also harm some individual patients. If the toxemia *causes* the damage, then the prompt interruption of a hypertensive pregnancy at the first sign of developing toxemia should benefit the patient. Moreover, the courageous adherence to this policy would allow us to give any hypertensive a "trial of pregnancy."

(The above paper was the well deserved Prize Award Thesis for 1946 of the American Association of Obstetricians, Gynecologists and Abdominal Surgeons. Thanks to the studies of Chesley and his associates, together with observations made by other students of the subject during the past 10 years, the management of hypertensive disease complicated by pregnancy is on a much sounder and better documented basis than formerly,—and surely is much more conservative. Indeed, with certain exceptions, a hypertensive woman desirous of having a baby can now be advised something as follows: 1. With proper



and alert management of the pregnancy, the hypertensive disease will not be permanently aggravated as the result of gestation. 2. The chances are 1 out of 3 or 4 that an acute flare-up will occur (pre-eclampsia) and by "proper and alert management" is meant prompt termination of the pregnancy if this develops. 3. Because of the latter contingency and other possible accidents, the outlook for a living child is somewhat discouraging but is better than 50-50 and in mild cases much better. 4. The immediate hazards of pregnancy are not great.

But, as noted above, there are certain exceptions to this relatively sanguine outlook. Some of these exceptions, which point to a much graver prognosis, are as follows:

1. If in the previous pregnancy, acute toxemia was superimposed on chronic hypertensive disease, the chances of repetition are so great as to render another pregnancy hazardous and also well-nigh futile. Chesley notes this and reports a 71 per cent rate of recurrence.

2. If there is evidence of hypertensive heart disease (definite enlargement, etc.), pregnancy carries grave risks to the mother. Although cardiac size by x-ray was determined by Chesley at follow-up, I cannot find that he comments on its prognostic significance in relation to future pregnancies. However, of the 35 remote deaths reported by him, 9 were due to heart failure. Since heart failure is one of the most common modes of death in hypertensives and since pregnancy does increase cardiac work, the inference to be drawn in regard to hypertensives with definite cardiac enlargement would seem clear.

3. If renal function is markedly impaired, the life expectancy of the patient is poor, of course, regardless of pregnancy, but even moderate diminution in renal function augurs ill for the success of gestation. In a previous study by Chesley, among 82 patients who failed to concentrate as high as 1.022, there were 36 fetal deaths, or 43.9 per cent. Urea clearances were done in the patients who failed to concentrate to 1.022. There were 11 pregnancies in 11 patients, where the clearances were less than 70 per cent. Nine of the babies were lost, a mortality rate of 81.8 per cent (*Am. J. Obst. & Gynec.*, 53, 372, 1947).

4. Patients with old retinal exudates or fresh hemorrhages will usually show evidence of renal disease also and so will fall in the above group with diminished renal function, but in my experience their outlook for pregnancy is so very poor as to deserve special mention.

5. Patients whose initial blood pressure is 200 systolic or above, and/or 120 diastolic or above, encounter a fetal mortality rate in excess of 50 per cent and, in my experience, face also a higher incidence of maternal complications, but Chesley's figures do not confirm this.—Ed.)

## THE OVERWEIGHT OBSTETRIC PATIENT WITH SPECIAL REFERENCE TO THE USE OF DEXEDRINE SULFATE

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*J. Oklahoma M. A.*, 40: 119-122, 1947

The writer reports the treatment of 70 cases of obesity during pregnancy in which dexedrine sulfate, in conjunction with a low caloric diet, was used for control of appetite. The results indicate that this drug is nontoxic, safe and useful as an aid in preventing excessive weight gain in pregnancy.

Eight of the 70 patients were markedly obese prior to pregnancy and the dietary regimen was instituted during the first trimester. Every one of these

patients weighed less at delivery than at the onset of pregnancy, the smallest loss being 2 pounds, the largest loss 16 pounds, and the average loss  $9\frac{1}{2}$  pounds.

Forty-six cases were unable to control their weight by diet alone during the second trimester and received dexedrine during the second and third trimesters. The average total gain of weight for the entire pregnancy in these patients was 7.8 pounds, the greatest gain being 23 pounds and the smallest, one pound.

The remaining 16 cases did not start to gain weight excessively until the last trimester, and they were under control for the last 2 or 3 months of pregnancy only. Six patients were held to no further gain, and the remaining 10 patients lost from 2 to 11 pounds during the last 3 months. The average total gain for the entire 9 months of pregnancy for the entire series of 70 cases was 7.4 pounds.

A control series of 50 successive obstetric patients who did not receive dexedrine to control obesity, but who received the same dietary instructions, averaged 28.6 pounds gain in weight during the entire 9 months of pregnancy, the smallest gain being 18 pounds and the largest, 54 pounds.

Of the 70 cases in the dexedrine-treated series, there were no fetal abnormalities and no maternal or fetal deaths. The babies were well nourished and normal in size. Many patients who had been quite obese at previous delivery had easy deliveries compared with previous difficult deliveries. Almost all of the women continued to control their weight after delivery because they had corrected poor eating habits during pregnancy.

The patients were instructed to adhere closely to 1,000 to 2,000 calories daily. Each case received one gram of protein daily for each pound of ideal weight. A multivitamin capsule was given daily. Dexedrine sulfate was given one hour before each meal; the average daily dose was 30 mg., given 10 mg. before each meal. About one-half the patients complained of mild side effects—"jitteriness", palpitation and insomnia. These were all relieved by  $\frac{1}{4}$  to  $\frac{1}{2}$  grain of phenobarbital given with each dose of dexedrine. It has been shown that the 2 drugs offset the effects of each other about grain for grain. Patients who were refractory to weight loss and all patients in the last month were instructed to restrict moderately their fluid intake and to eat a salt free diet. If this was not sufficient, 45 grams of ammonium chloride were given daily.

The original basal metabolic rate determinations averaged minus 3. The average reading when the patients were taking dexedrine was plus 4. The author believes that this was probably due to a correction of relative hypothyroidism through weight loss rather than through a direct action of the drug.

No effect on the blood pressure and no hypertension was encountered except in 6 patients who had a hypertension with marked obesity in early pregnancy. In all cases the blood pressure was reduced to normal and remained so throughout pregnancy and after delivery. The fall was in direct proportion to the amount of weight loss.

Dexedrine sulfate should not be used in patients hypersensitive to ephedrine-like compounds, in those manifesting anxiety or hyperexcitability, or in agitated pre-psychotic states. Careful studies have shown no toxicity of the drug until many times the usual dose was used. As to the danger of addiction, the author

has used this drug in over 400 patients and has never found one who refused to discontinue the drug. If the drug is withdrawn gradually over a 2 or 3 weeks' period, no inconvenience is experienced.

## THE EFFECT OF PREGNANCY COMPLICATED BY ALLOXAN DIABETES ON THE FETUSES OF DOGS, RABBITS AND RATS

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*Endocrinology, 40: 251-258, 1947*

Diabetes Mellitus was induced in female rabbits, rats and dogs by the injection of alloxan. Only those animals which developed significant glycosuria were included in this study. All rats and rabbits were bred after becoming diabetic, while the dogs were bred 19 to 23 days before alloxan was injected. The amount of sugar in the urine was determined, for the most part, every day. Protamine zinc insulin was administered only to prevent severe glycosuria; no attempt was made to render the urine sugar free.

Nine diabetic rabbits were followed through 17 pregnancies. About half of the pregnancies were full term. There were many abortions, premature deliveries, stillbirths and the delivery of immature fetuses. This is quite in keeping with the late accidents that occur in human diabetic pregnancies. Not all of the fetal deaths in the experiments with rabbits can be attributed to a failure to keep the glycosuria within reasonable limits, since 2 of the pregnancies in the diabetic rabbits occurred at a time when glycosuria was minimal and had been so for several days preceding the termination of pregnancy. No evidence was found of an increased birth weight among the fetuses of the diabetic rabbits.

Eight diabetic rats were followed through 10 pregnancies. All 10 pregnancies resulted in the birth of healthy appearing fetuses. There was no evidence that the birth weights of the fetuses resulting from diabetic pregnancies were different from those of the fetuses born to normal rats. These results, which are the opposite of Long's experience of 39 pregnancies in 15 severely diabetic rats ending in reabsorption of the fetuses in all cases, may be explained by the fact that all rats in the present study would be considered as having mild diabetes.

Of 7 dogs which were bred and injected with alloxan, only 3 developed glycosuria and became pregnant. Only one of the 3 pregnancies was abnormal; in this case, on the 52nd day of pregnancy one small dead fetus was found in the cage. The other 2 dogs delivered live healthy puppies on days 62 and 61 of pregnancy, respectively. The injection of alloxan during pregnancy appeared to have no ill effect on the fetuses. One dog which failed to develop significant

glycosuria with increasingly large injections of alloxan up to 125 mgm. per kg. between the 35th and 52nd days of pregnancy, delivered a healthy appearing litter of 8 puppies on the 63rd day of pregnancy.

(When alloxan diabetes was first reported it was natural to hope that here was a tool which would solve in the laboratory some of the problems presented by human diabetics in pregnancy. Miller's failure to produce in experimental animals anything resembling the disorders commonly seen in clinical obstetrics is hence very disappointing. Although it would be an expensive undertaking, it is conceivable that the results would be different if monkeys were used.—Ed.)

## PREGNANCY COMPLICATING DIABETES OF MORE THAN TWENTY YEARS DURATION

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M. Clin. North America, 31: 395-405, 1947

Because diabetes predisposes the pregnant woman to preeclampsia and because it predisposes the patient to vascular disease, it is pertinent to ask the following question: Is prolonged duration of diabetes consistent (1) with maternal survival, (2) with maternal well being and (3) with fetal survival.

The author points out that in typical diabetic pregnancies, maternal survival can be assured, that fetal survival approaches normal and that the incidence of preeclampsia can be lowered when abnormal hormonal balances are corrected. However, control of vascular disease has not paralleled the control of preeclampsia in the patient with an onset of diabetes in childhood. She further points out the similarity in the histopathology of long standing diabetes and prolonged preeclampsia.

Two groups of patients were studied to answer the questions postulated in the first paragraph. The first group had diabetes of 20 to 25 years' duration. In this group the fetal survival was 75 per cent. Preeclampsia complicated the pregnancy in 3 of the 8 cases, and some degree of vascular disease was present in all of these cases. In the second group of patients (having had diabetes for more than 25 years) the fetal mortality was 66 per cent and the incidence of preeclampsia was 66 per cent. All 3 of the mothers survived, but showed marked evidence of vascular or renal disease. All of the cases have persistent albuminuria and 2 patients have marked hypertension. In each of these cases the insulin requirements increased during pregnancy and their diabetic status post partum was definitely worse.

From the foregoing, White has concluded that in diabetes of between 20 and 25 years' duration, maternal survival, fetal survival and maternal morbidity parallel the degree of pre-pregnancy vascular disease, and that after 25 years

of diabetes the fetal survival is hazardous, the maternal morbidity probable and the maternal survival a gamble. Because of this the author advises against pregnancy in diabetic women over thirty years of age whose diabetes is of 25 years' duration.

(This is an important point to bear in mind in establishing the outlook for pregnancy in diabetic gravidæ. At the 1947 meeting of the American Medical Association Priscilla White exhibited x-ray films showing the extreme degrees of calcification which may develop in the uterine arteries of women whose diabetes is longstanding. The calcified uterine vessels stood out so plainly in her roentgenograms that they were plainly visible 10 feet away. In the presence of such changes it is easy to understand how the uteri supplied by these vessels would have difficulty in maintaining proper vascular relationships for the placenta and fetus and how many infants might die in utero as the result.

In a recent evaluation of the vascular damage wrought by diabetes Dolger has found that intercapillary glomerulosclerosis, in association with hypertension, retinopathy and albuminuria, exists to some degree in every case of diabetes mellitus of long duration (J.A.M.A., 134, 1289, 1947). Because of the age range of pregnancy the course of the 55 juvenile diabetics followed by Dolger will be of most interest to the obstetrician since, for the most part, it is only females of this group who will present both pregnancy and longstanding diabetes. In all these patients the disease had begun before the age of 20, in 1 at 11 months. There were 7 fatalities among the 55: 3 from intercapillary glomerulosclerosis, 2 from cerebral accidents without hypertension and 2 postoperatively of unknown causes. In 20 of these young diabetic patients the treatment satisfied all orthodox criteria for excellent diabetic control, namely, adherence to moderate carbohydrate, low fat diets and exhibition of little or no glycosuria. Within a range of 6 to 22 years after the disease had first become manifest, retinal hemorrhages were noted in all these patients, with an average duration of diabetes of 13 years. By the time retinopathy developed 50 per cent presented definite hypertension and 30 per cent albuminuria. A parallel group of 18 patients (among the 55 juvenile diabetics) in whom only a fair degree of diabetic control could be obtained, presented retinal hemorrhages within 5 to 20 years after onset, the average duration of diabetes for the group being 10.4 years. At this time one-third of the 18 patients displayed hypertension and albuminuria. The third group of these 55 patients, 17 in number, had been categorized as having an unusually severe, brittle form of the disease in which glycosuria and hyperglycemia defied all therapeutic measures. In this group retinal hemorrhage was noted 5 to 19 years after the onset of diabetes, with an average group span of 12.4 years. Hypertension accompanied this finding in 40 per cent of patients and albuminuria in 64 per cent with both usually occurring in the same patients. To summarize Dolger's study: no matter how well the diabetes has been controlled, the triad of retinopathy, hypertension and albuminuria makes its appearance in the majority of diabetics during the second decade after the development of the disease. In a communication previous to the one abstracted above, Priscilla White has noted that "the incidence of degenerative complications in juvenile diabetics far exceeds expectation . . . arteriosclerosis appears inevitable." (New England J. Med., 224, 586, 1941.)

These observations on the damage which diabetes does to the vascular system after a decade or two, make plain a number of facts: (1) the outlook for successful childbearing in gravidæ whose diabetes is of 2 decades or more in duration is necessarily poor, as White stresses; (2) the incidence of hypertensive toxemia in gravidæ whose diabetes is of a decade or more in duration is bound to be high as all observers have reported; (3) diabetic gravidæ, especially those with longstanding diabetes, merit thorough vascular study including retinal examination.—Ed.)

## SUBACUTE BACTERIAL ENDOCARDITIS DURING PREGNANCY

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Am. J. Obst. &amp; Gynec., 53: 878-880, 1947

A 31-year-old patient was seen at about the sixteenth week of her third pregnancy. She had had 2 previous cesarean sections for cephalopelvic disproportion. Examination was negative, except for a high titer for brucellosis, 1:40. The prenatal course was uneventful until about 32 weeks. She was admitted to the hospital on Aug. 20, 1945, for protracted sore throat, feeling of lassitude, anorexia, night sweats, epistaxis and roaring in the ears. Physical examination was negative except for a loud, harsh heart murmur replacing the first sound at the apex. Blood counts revealed a moderate anemia. Nose and throat cultures showed 2 colonies of *beta hemolytic Streptococcus*. X-ray of the chest showed the heart to be 40 per cent oversize.

The patient ran a low grade temperature which slowly rose. In a few weeks her finger tips changed color, and she developed a transient numbness and tenderness. The heart murmur was more pronounced and the size had increased to 60 per cent above normal. Blood cultures were positive for the first time and revealed a culture of *Streptococcus viridans*, later identified as *Streptococcus salivarius*. Repeat cultures confirmed the diagnosis of subacute bacterial endocarditis.

Penicillin therapy was started (1,000,000 units a day) and small blood transfusions were given. She promptly became afebrile and remained so during her entire hospital stay, except for the day following the operation. Cesarean hysterectomy was performed on Sept. 29, 1945, to decrease the hazard of post-operative infection and because this was her third abdominal delivery. Operation was withstood well and recovery was entirely uneventful.

The amount of penicillin was doubled until it was discontinued on Oct. 18, the patient receiving a total dosage of 45,850,000 units. The heart decreased slowly in size, and at discharge on Nov. 13, repeated arterial and venous blood cultures were negative, the sedimentation rate was approaching normal and the white count was normal. During the past year the patient has been well, although the heart is enlarged and the findings are typical of mitral disease.

The authors have not been able to find the report of a patient who developed this complication during pregnancy, survived, and subsequently gave birth to a living child. 1 figure.

PREGNANCY COMPLICATED BY TYPHOID AND  
PARATYPHOID FEVER

HANNES SAURAMO

*From the First Women's University Clinic in Helsinki. Chief: Professor  
Mauno Rauramo**Acta Obstet. et Gynec. Scandinav., 27, 58-69, 1947*

The author reports on 24 cases of paratyphoid and 3 of typhoid fever in pregnant or freshly puerperal women. These were observed by him in the epidemic which developed in Helsinki in the fall of 1945 and represent the largest series reported since 1916.

The author's observations lead him to believe that pregnancy neither protects a gravida against these infections nor conduces to it. This conclusion is based on the fact that the percentage of pregnant women developing paratyphoid or typhoid were the same in this epidemic as among nonpregnant women of comparable age. The symptoms of the disease were in general not typical. Delivery usually took place 1 to 11 days after the symptoms had appeared. There were no puerperal disturbances. All the patients recovered except one who died on the 17th day. Premature birth occurred in 56 per cent of the cases. Abortion was observed in 7 cases, in 5 of which the cause was paratyphoid and in 2 typhoid. Abortion usually took place at the end of the first and especially within the second week after the symptoms had appeared, while premature delivery in general occurred in the course of the first week. The author considers that the prognosis for the mother is fairly good and for the child also provided delivery takes place in the tenth month of pregnancy or at term. In the first half of pregnancy the fetus as a rule dies and abortion or premature labor ensues. Agglutinins are formed in the fetus by way of passive immunization through the mother. In other words a positive Widal in the fetus does not necessarily signify an infection and agglutinins may well be encountered in the infant, especially if the mother has been ill for a long time. These agglutinins usually disappear within 7 days after birth.

In conclusion, the author reports from the literature on experiences with vaccination against typhoid fever during pregnancy and the puerperium. Thus, immunization in the final stage of pregnancy is of no danger for the mother or her child. During the puerperium, however, general reactions occur more often and are more violent than in the final stage of pregnancy. On the other hand, the author's review of the literature leads him to believe that immunization performed during the first half of pregnancy may lead to violent reactions in the majority of gravidae and often results in spontaneous abortion. Thus, he quotes one author who reported an incidence of reaction of 96 per cent. Among 23 women immunized 20 aborted immediately, in 2 cases abortion was imminent and in one case premature delivery ensued two months later. In the author's opinion therefore an oversensitivity to alien albumen seems to be present in the early phases of pregnancy.

(The warning implied in the last paragraph above is worth remembering. It is customary for Occidentals living in the Orient to take typhoid inoculations every 2 years and, especially at times of epidemics, a few pregnant women sometimes receive them. I know personally of 2 such cases in which abortion ensued promptly after either the first or second injection; and physicians who have practised long in the Orient can tell of many more. Hence, although the figure of 96 per cent cited above may be too high, the evidence is rather clear that typhoid immunization in the first half of pregnancy does conduce to abortion and should be deferred, preferably until 6 weeks after delivery. If the urgency is great, as in an epidemic, inoculations may be given in the last trimester with apparent safety.—Ed.)

### TRUE KNOT IN THE UMBILICAL CORD CAUSING DEATH OF MONOAMNIOTIC TWINS IN A PRIMIPARA BEFORE LABOR

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*Am. J. Obst. & Gynec.*, 53: 886-887, 1947

A 20-year-old primipara, whose expected date of confinement was Aug. 27, 1942, had an uneventful prenatal course until April 21, 1942, when slight spotting of blood appeared. This ceased with bed rest and sedation. On June 30, there was an increase in blood pressure which fluctuated for the next 2 weeks between 134/94 and 140/100, with a trace of albumin present. At the same time fetal heart sounds became inaudible. On July 12 the patient was admitted with irregular abdominal pains, blood pressure of 135/95, slight ankle edema and a trace of albumin in the urine. Treatment with bed rest, sedation, salt-free diet and concentrated glucose resulted in recession of the toxemic symptoms. On July 14, labor was induced by castor oil, enema and quinine. Male twins were delivered spontaneously on July 15; both were discolored and macerated, having apparently been dead for some time. There was but one placenta with 2 cords, the middle thirds of which were intertwined and knotted, causing a cluster of knots the size of a clenched fist. The postpartum course was uneventful.

The incidence of monoamniotic twins has been variously estimated by Müller at 1:6,000, and by Rosenberg at 1:60,000. Quigley found 109 cases in the literature, with torsion or true knot formation in 53.2 per cent. Quigley mentions eclampsia 4 times in this series; both McNally's and the authors' case, in which the fetuses died prior to labor, were mildly toxic. 1 figure.



# A STATISTICAL STUDY OF THE CASES OF PLACENTA PREVIA OCCURRING IN THE JEWISH HOSPITAL FROM 1935 TO 1946

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Am. J. Obst. & Gynec., 53: 1024-1028, 1947

The authors report a series of 165 cases of placenta previa occurring at this hospital from Jan. 1, 1935, to July 1, 1946 and representing an incidence of 0.43 per cent among 37,688 deliveries during that time. There were 61 primiparas and 104 multiparas in the series. Previous bleeding was recorded in 64 cases. Membranes were intact in 149 cases, and ruptured in 16. Nine patients were admitted in labor and 5 of these did not present symptoms of placenta previa until after the onset of labor. The varieties of previa were as follows: central, 37; partial, 73; and marginal, 43.

Ninety-seven of the 165 cases were handled by abdominal cesarean section, one by vaginal cesarean and 67 by the vaginal route. Blood transfusions were given to 43 patients. The cases handled vaginally were treated as follows: vaginal hysterectomy, 1; nothing, or ruptured membranes, 21; and other vaginal methods (bag alone, bag and version, or version-extraction), 46 cases. The fetal mortality was 25.8 per cent and the maternal mortality was 0.6 per cent.

A study of the relationship between management and fetal results illustrates rather strikingly that the best fetal results are obtained when either a very simple vaginal procedure or when a section is done. In these 2 groups the fetal salvage was over 85 and over 88 per cent, respectively. The highest fetal mortality was found in the group handled by either bag, bag and version or version-extraction; the fetal survival rate in this latter group being only 37 per cent.

The one maternal death in this series resulted from sepsis, the patient dying on the twelfth day after delivery. Central placenta previa was diagnosed in this patient on a third vaginal examination; the membranes were ruptured and a bag inserted through the placenta. Forty-nine hours later the bag was expelled and a hand and a cord prolapsed. A version was done and spontaneous delivery followed. The patient also had a toxic anuria with a urea nitrogen of 153 and a positive blood culture for streptococcus viridans was obtained during her illness.

Of the 21 cases treated by simple rupture of the membranes, 3 were morbid (14.2 per cent) and the average number of days of morbidity was 2. Of the 46 cases treated by more complicated forms of vaginal delivery, 14 (30.4 per cent) were morbid, and the average number of days of morbidity was 3.8. Of the abdominal sections, 51 of the 97 cases (52.6 per cent) were morbid, and the average number of days of morbidity was 4.1. No appreciable difference in morbidity was noted between the classical and low-flap sections.

This group of cases is compared with a previous series of 283 cases reported from the authors' hospital 10 years ago, with a fetal mortality of 46.3 per cent

and a maternal mortality of 5.3 per cent. The writers believe that the reasons for the marked improvement in fetal and maternal mortality are the greater number of cases that were handled by either simple rupture of the membranes or cesarean section, and also the more frequent use of blood transfusions.

All agree that central placenta previa, in primiparas or multiparas, should, with almost no exceptions, be handled by section. Some state that all previas in primiparas, except the marginal variety, should be handled by section. The hydrostatic bag, or the bag followed by other vaginal manipulations, is not a good method of treating placenta previa. The writers predict that it will eventually be discarded completely. The results of the present series of cases have convinced the authors that the best results follow either simple rupture of the membranes or cesarean section. Practically the same conclusions were reached by Watson and Gusberg; Yepes and Eastman; and Williamson and Greely. The recent papers by Johnson of Texas and MacAfee of Belfast, Ireland, and the comments upon them by Eastman, seem to indicate that it is probably safe to temporize in some of the nonviable or near viable cases provided they are under good care, can be watched closely, and where blood loss can easily be replaced. This should bring about considerable improvement in the fetal mortality, and is worthy of trial.

## OVARIAN PREGNANCY: CASE REPORT

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Harper Hospital Bulletin, 5, 55-57, 1947

In 1932, Wollner studied the reported cases and found only 48 of 87 acceptable as primary ovarian pregnancies (Am. J. Obst. & Gynec., 23, 262, 1932). Thomas, in 1943, gave a total number of authentic cases as 65 (J. Obst. & Gynaec. Brit. Emp., 50, 189, 1943). While recognized as an entity much earlier, it was not until 1879 that criteria for positive diagnosis of ovarian pregnancy were laid down by Spiegelberg which hold good to the present. These are:

- (1) The tube on the affected side must be intact.
- (2) The fetal sac must occupy the position of the ovary and
- (3) Must be connected to the uterus by the ovarian ligament.
- (4) Definite ovarian tissue must be found in the wall of the sac.

A case of ovarian pregnancy is reported in which the patient after manifesting the symptoms and signs of ectopic pregnancy was operated upon on March 2, 1946. Upon opening the abdomen old blood and clots were encountered and the cul-de-sac contained 300-350 cc. of free blood and clots. The right appendage was exposed and the tube was found to be free and intact with patent lumen. The right ovary, however, was apparently the site of the bleeding and was

covered with clots. It was attached to the uterus by the ovarian ligament. Right salpingo-oophorectomy was done, care being taken to preserve the specimen intact. A tentative diagnosis of right ovarian pregnancy was made. Five hundred cc. of blood was given and the patient returned to bed in good condition. Convalescence was uneventful.

The specimen consisted of tube and ovary. The ovary measured  $5 \times 3 \times 3$  cm. The tube, 6 cm. in length, was normal in appearance. At one pole of the ovary was an adherent blood clot. Cut section revealed a 1 cm. fetus in situ and apparently imbedded in the ovarian structure. Three hundred and sixty serial sections were made for microscopic study. Examination of these showed that the fetal sac was definitely surrounded by ovarian tissue. Both amnion and chorion could be seen and villi extending into the ovarian substance were demonstrated. Although the sac was imbedded in ovarian tissue, it was difficult to demonstrate ovarian stroma to the author's satisfaction on account of the compression of tissue and infiltration of blood due to hemorrhage. Careful study, however, disclosed a follicle which with high magnification proved the point in question.

(The June issue of the Harper Hospital Bulletin, in which the above case report and other noteworthy obstetrical and gynecological articles appear, is a special number published in honor of Dr. George A. Kamperman. As Head of the Department at the Harper Hospital from 1921 to 1945, Dr. Kamperman was responsible for the development of one of the great clinics of our specialty and this little brochure will be welcomed everywhere as a tribute to him.—Ed.)

## ECTOPIC PREGNANCY; A CONTRIBUTION TO THE PROBLEM OF THE DECIDUAL TRANSFORMATION OF THE ENDOMET- RIUM IN THE PRESENCE OF ECTOPIC PREGNANCY

W. OPPENHEIMER

*Jerusalem*

Harefuah., 32: 1-4, 1947

The mucous membrane of the corpus uteri was examined in 4 cases of ectopic pregnancy. In the first 2 cases it was established that no transformation of the endometrium into a *decidua graviditatis* had taken place. In one of these, the endometrium was in a state of inactivity, while in the other a *decidua menstruationis* was found, while in addition there was a small myoma of the tube, medial to the site where the ovum had settled, which probably provided the obstacle to normal nidation.

In the third case the amount of mucous membrane available was insufficient to establish a diagnosis. The fourth patient was suffering from endometritis, and this may have prevented the decidual transformation of the endometrium. From these studies it appears that the old theory that in the presence of ec-

topic pregnancy the endometrium always undergoes decidual transformation cannot be maintained any longer. Consequently, the absence of decidual tissue in the uterus cannot be used as a diagnostic criterion, while, conversely, the presence of decidual tissue without intrauterine pregnancy is practically always indicative of ectopic gestation, since its only alternative cause is the very rare corpus luteum cyst.

## METASTATIC CHORIONEPITHELIOMA OF THE LUNG TREATED BY LOBECTOMY

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*Memorial Hospital, New York, N. Y.*

*Am. J. Obst. & Gynec., 53: 674-677, 1947*

In the case presented by the authors, a 32 year old woman was known to have a pulmonary metastasis from chorionepithelioma for at least 11 months prior to its removal by lobectomy. This was proved by roentgen evidence of a mass in the right lower lung field approximately  $2\frac{1}{2}$  years after operation for the removal of an hydatidiform mole. The Aschheim-Zondek test became positive 5 months prior to lobectomy. The following month, dilatation and curettage revealed no tumor or decidual tissue. Radiation therapy was given to the chest over the site of the tumor; 2,100 roentgens total was given to each of 2 fields.

A daily dose of 300 roentgens was given to alternating fields. Following this therapy, there was little change in the size of the mass as seen on the roentgenogram. Hemoptysis finally occurred and there was roentgen evidence of further enlargement of the mass in the lung. Because of the atypical course of the tumor, a right lower lobectomy was felt justified and was performed. An Aschheim-Zondek test performed a day before lobectomy was positive, whereas another test done a day after operation was negative. Pathologic examination of the lobe of the lung showed a large, circumscribed tumor mass measuring 6.5 by 6 by 5 cm., and about three-fourths of a centimeter from this mass, a second small nodule less than one cm. in diameter. Both masses were very hemorrhagic in the center and elsewhere rather granular looking. There appeared to be a direct extension of the tumor into adjacent anthracotic peribronchial lymph nodes. Microscopic findings were typical of chorionepithelioma.

Complete hysterectomy and bilateral salpingo-oophorectomy were performed 2 days after lobectomy. Careful examination failed to reveal the presence of any tumor in the uterus or adnexa. Three years after operation, the patient is well and free of all symptoms or evidence of disease. Repeated roentgenograms of the chest and repeated Aschheim-Zondek tests have all been negative.

The authors feel that lobectomy was of great value in treating this particular patient, but realize that the plan of therapy followed could be feasible only in a very small percentage of cases of chorionepithelioma. 4 figures.

# PATHOLOGY OF LABOR AND PUERPERIUM

## ACUTE TORSION OF THE UTERUS DURING LABOR

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Harper Hospital Bulletin, 5, 65-66, 1947

A case is reported in which the patient, aged 30, para 0, gravida 3, and presumably normal, was admitted to the Harper Hospital at 10:20 A.M., March 3, 1934, after 4 hours of labor. At this time the cervical os was dilated 2 cm., the presenting part being palpable 2 cm. above the level of the ischial spines. Abdominal examination showed the normal contour of a full term pregnancy with the fetus in left occiput anterior position. Uterine contractions recurred at 3-4 minute intervals with little resulting progress throughout the entire day. At 9:00 P.M. the contractions increased in severity and frequency (1-1½ minute intervals) without increased cervical dilatation, although the presenting part descended to a level of 1 centimeter above the spines. Two hours later, dilatation increased to 2.5 centimeters, and it was noted that the presenting part was again 2 centimeters above the interspinous level.

Suddenly, a few minutes before midnight, the patient cried out in severe, agonizing pain associated with tonic contraction of the uterus. A change in contour of the abdomen was noted, the fetal presentation having changed from longitudinal to semi-transverse with the head now floating above the inlet. Because of the intense, tonic contraction threatening uterine rupture, inhalation anesthesia was administered to relax the uterus. Following consultation with Dr. George Kamperman, immediate cesarean section was performed.

On opening the peritoneal cavity under spinal anesthesia, acute axial torsion of the uterus from left to right was recognized. The left tube and round ligament lay anteriorly in the midline. After restoring the uterus to its normal relationship, a low cervical cesarean section was performed, delivering a living female child weighing 6 pounds and 15 ounces. Careful inspection showed no evidence of rupture of the uterus. The postoperative recovery was uneventful.

Reis and Chaloupka, in reporting a similar case of their own in 1935, were able to find only 15 other previously published cases (J. A. M. A., 104, 2080, 1935). Except in the presence of tumors or obvious uterine malformations, the cause of acute axial torsion is difficult or impossible to determine, although Robinson and Duvall stated categorically that "without uterine abnormalities there can be no torsion" (J. Obst. & Gynaec. Brit. Emp., 38: 55, 1931). In the present author's case, as in others listed by Reis and Chaloupka, no obvious malformation was recognized. It is possible that unrecognized degrees of developmental asymmetry of the uterine musculature might permit accentua-

tion of the lateral torsion which occurs so frequently during normal gestation. The direction of rotation is usually clockwise (as viewed from below). The signs of acute intraperitoneal crisis during the course of long unproductive labor, suggesting imminent rupture of the uterus, with associated change in contour of the abdomen, are the chief diagnostic features. The diagnosis is usually made only after opening the abdomen, although Reis and Chaloupka were able to make a correct preoperative diagnosis by palpation and visualization of the tense left round ligament through the unusually thin abdominal wall of their patient. Because of the acute circulatory disturbance leading to edema and necrosis of the uterine musculature fatal outcome is not uncommon and immediate cesarean section is urgently indicated.

(See editorial note in August issue of Survey, Pp. 468-470.)

## TRIAL LABOUR

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Med. J. Australia, 1, 379-380, 1947

The author first reviews the various measures which are used to forecast whether disproportion is likely to exist at term such as clinical pelvimetry, x-ray pelvimetry, past history and certain methods based on attempts to push the head downward into the pelvis. In grossly contracted pelvises cesarean section is of course recommended.

When there is definite disproportion at the brim, pregnancy tends to extend beyond the calculated date and with labor there is primary uterine inertia. The head remains high, does not become fixed, projects abnormally forward and does not flex. With lesser degrees of disproportion labor may come on at the expected time and progress normally with the head settling down, but then the pains may deteriorate, the head cease to descend and become deflexed. Vaginal signs of disproportion at the brim are a sausage-shaped bag of waters, early rupture of the membranes and reformation of the cervix when the membranes rupture. In addition the cervix does not dilate, its edge becomes thickened and is not closely applied to the head during a contraction. The head does not descend but the presence of a large caput succedaneum and extreme molding may simulate descent. Extreme asynclitism may also be observed.

Disproportion in the cavity of the pelvis may be the result of actual disproportion or may be due to an error in fetal attitude or position. The diagnostic signs are those of secondary uterine inertia together with the impaction of the head which prevents it advancing or descending with a pain. If the cervix is still palpable and the head in good position, sedatives are used. This allows

further molding of the head and stretching of the soft parts to take place after which the uterus should again be able to produce further descent.

In regard to disproportion at the outlet, a resistant perineum and an occiput-posterior position are the most common causes of difficulty. Here again uterine inertia occurs associated with lack of progress of the head. When it is recognized that descent has ceased the patient should be delivered with forceps after a preliminary episiotomy.

(This article emphasizes a neglected aspect of labor in the presence of disproportion, namely, the almost invariable association of uterine inertia. As the author points out, the usual picture with inlet disproportion is early rupture of the membranes, weak pains and a cervix that dilates very slowly up to about 5 cm. and then remains stationary. This is why the old "test of labor"—that is, 2 hours of second stage pains—is impracticable, because the majority of these cases will not go much beyond 5 cm. even after a day or two of labor. Conversely, in trial labors, if the cervix dilates at a satisfactory rate the outlook for the head's passing through the brim is good.—Ed.)

## EXPERIENCE WITH MIDPELVIC DYSTOCIA; PRELIMINARY REPORT

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*Am. J. Obst. & Gynec.*, 53: 823-828, 1947

Midpelvic dystocia can occur in a patient with inlet and outlet measurements at the lower limit of normal. Guerriero, Arnell and Irvin believe that dystocia may be expected when the sum of the interspinous and posterior sagittal diameters is 13.5 cm. or less, while Weinberg and Scadron favor 13.0 cm. There is need for collection and evaluation of accurate statistics on the pelvic midplane.

The present report is based on the pelves of 140 patients, which were evaluated by a combination of radiographic mensuration and graphic portrayal. Of these, 102 patients included only those with varying degrees of contraction of one of the 3 essential pelvic planes. Another 12 had had unexplained stillbirth or previously difficult forceps operations. The remaining 26 patients were included since the institution of routine radiographic mensuration and graphic portrayal of each primigravida and all multigravidas with previous difficulty.

A review of the outcome of delivery in relation to the sum of the transverse and posterior sagittal midplane dimensions is presented. In general, the frequency of necessary operative delivery and the rate of infant death decreased as this sum increased. However, it is of interest to note that in several instances vaginal delivery was accomplished successfully in spite of seemingly severe contraction. Impressions gained solely from pelvic mensuration with-

out consideration of the size of the baby are often subject to error. Of 10 patients with midplane measurements totaling less than 13 cm., 8 were delivered vaginally, 3 of them spontaneously. In 2 patients the sum of the interspinous and posterior sagittal diameters was less than 12 cm. One was delivered spontaneously of a 2,912 Gm. infant. The other, with an unusually ample forepelvis, required midforceps operation, but produced a living 4,571 Gm. child. In 3 patients with midplane measurements between 12.0 and 12.4 cm., there was one fetal death from craniotomy necessitated by insurmountable midplane disproportion after the head passed through the pelvic inlet. The other 2 infants were born spontaneously and by low forceps, respectively. In 5 patients with midplane measurements totaling between 12.5 and 12.9 cm., the largest infant was delivered by cesarean section, the next largest by midforceps, 2 smaller ones by low forceps, and the smallest spontaneously. There were 3 fetal deaths in 29 patients with the sum of the midplane diameters less than 14 cm. (10.3 per cent), as opposed to 6 fetal deaths among 111 patients with a sum of 14.0 or more cm. (5.5 per cent).

The authors discuss the results of "prediction" of the course of labor in this series. Pelvic measurements were graphically portrayed by means of the method recently described by Mengert and Eller. A plastic transparent model, representing a small, medium or large fetal head was superimposed on the pelvic diagram. This permits understanding of the possibility of passage and of direction, and, in the event of forceps delivery, often indicated the mechanisms and rotations to be employed. It is of considerable prognostic significance to be able to classify fetal heads roughly as to size. Abdominal palpation and measurement of the head from the pelvic films, provided the child is near term and the head fixed, can supply this information.

"Prediction" was made in each of the 140 women in terms of "easy" or "difficult" vaginal delivery, or of necessity for cesarean section. A prediction of difficulty was made in 25 patients. Cesarean section was performed on 5 of them, eliminating them from proof of predictability. In 17 of the remaining 20 patients, difficulty was experienced.

Easy vaginal delivery was predicted for 115 patients, but 22 experienced some difficulty. In these 22 cases, there were 3 breech deliveries, 2 elective and unindicated forceps operations, and 6 patients with prolonged labor (more than 30 hours), thought to be due to uterine inertia rather than to bony dystocia.

Fetal size and moldability of the head, fetal attitude, and the force of uterine contraction must be considered as well as pelvic mensuration in evaluating bony dystocia. Of these, fetal size alone is susceptible to quantitative determination. From the standpoint of prognosis of the outcome of labor, the size of the head is more important than the weight or length of the baby.

In the relatively small group of cases with borderline inlet capacity, careful clinical observation of the degree of disproportion and descent, and of the forces and progress of labor, will generally allow an early determination of the procedure of choice. Serious dystocia at the midplane is encountered more frequently than at the outlet, but midpelvic capacity is seldom evaluated pre-



nately. Therefore, universal effort directed at collection and evaluation of midplane dimensions and their effect on the course of labor is urgently needed.

(This is another valuable paper by Eller, Mengert and their group on midpelvic contraction. As the authors wisely point out, X-ray pelvic measurements are not the only factor to be considered in such cases, but they do help a great deal. Thus, their statement that they encountered a fetal mortality of 10.3 per cent when the sum of the midpelvic diameters was under 14.0 cm., gives some idea of the risks to the average infant in such cases, but this figure will have to be documented—as they point out—by further observations. A fuller discussion of this subject is given in a note appended to the abstract of Eller and Mengert's previous article in the August issue of the Survey, pp. 488-490.—Ed.)

## THE MANAGEMENT OF DELIVERY FOLLOWING STILLBIRTH FROM PREVIOUS DYSTOCIA

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*Am. J. Obst. & Gynec., 53: 812-816, 1947*

The authors review the deliveries of 32 patients subsequent to stillbirth from dystocia in primary pregnancies. These patients were seen from Jan. 1, 1936, to July 1, 1946, and represent an incidence of 0.4 per cent in 7,265 deliveries. An earlier report concerned 33 cases delivered during the decade preceding 1936. In that time there were 3,953 deliveries, or an incidence of 0.8 per cent stillbirths from dystocia.

In the earlier series there was an uncorrected fetal mortality rate of 4 per cent and a corrected fetal mortality rate of 2 per cent in 50 deliveries subsequent to fetal death from dystocia in the primary pregnancies. In the more recent series a gross fetal mortality rate of one fetal death in 36 deliveries, or 2.8 per cent, was obtained. This infant was dead in the uterus because of a severe toxemia of the mother on her admission to the hospital. If correction may be allowed for this infant's death, there was no fetal mortality in the second series.

In regard to the histories of the initial pregnancies involving dystocia in the present series of 32 patients, actual bony dystocia seemed probable in 11 cases. The records of 21 of the 32 patients described difficult operative deliveries. There were 8 breech and one shoulder presentation. Faulty uterine dynamics were definite in 7 cases, and probably the incidence of this physiologic complication is understated. There is evidence that faulty timing of operative interference often led to disastrous fetal results.

No single criterion should decide the method of delivery after previous stillbirths. If the pelvis is adequate and there is normal vertex presentation, the prospects for successful delivery through the pelvis are excellent. Thirteen elective cesarean sections were done in the present series of 32 patients. In

9 of these, definite pelvic contraction was the indication. One of the remaining sections was done on a woman who had sustained a fractured pelvis and soft tissue trauma at her primary delivery elsewhere. Another section was performed in a case where 2 stillbirths previously had been associated with breech deliveries and recurrent toxemia. The other 2 operations were performed on the same patient, a woman who weighed more than 250 pounds and who was first seen for emergency treatment because of failure of attempts to deliver the aftercoming head of a 4,900 Gm. fetus. She subsequently was seen on 2 occasions with ruptured membranes and shoulder presentations. These 2 fetuses weighed 5,850 and 4,840 Gm., respectively.

It should be noted that 23 of the 36 deliveries in this series were conducted without resort to abdominal delivery, and all were successful in fetal outcome except the one case of macerated fetus due to recurrent toxemia. Among the 23 vaginal deliveries there were 3 by outlet forceps and one by midforceps operation.

There were no maternal deaths in the present series, although there had been one maternal death in the previously reported series.

When the data from both series are added together, it is seen that 64 women had lost 71 babies from dystocia prior to this study. Subsequently, they were delivered of 86 babies with 3 fetal deaths (3.5 per cent). Only 2 of the 64 women, including the one that died in the first series, are without normal living infants. One of these had a normal delivery but lost her infant some months later from nonobstetric causes.

The value of individual prenatal care, examination and study of the safest method of delivery for these patients is stressed. In these cases the conduct of the first delivery subsequent to the stillbirth from dystocia seemed to determine the outcome in later deliveries.

## LATE POSTPARTUM BLEEDING: A METHOD OF PREVENTION

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*Am. J. Obst. & Gynec.*, 53: 1019-1023, 1947

Despite conservative handling of the third stage of labor and careful examination of the placenta, the occasional retention of small pieces of placental tissue cannot be prevented or even detected at delivery. Subinvolution of the placental site without retention of placental tissue is often a definite cause of postpartum bleeding. If placental tissue is retained, or if there is subinvolution of the placental site, the characteristic clinical signs during the postpartum period are:

1. Lochia rubra persisting beyond the sixth or seventh day.
2. Subinvolution of the uterus.

3. A persistent low-grade temperature of 99 to 100 degrees F., or even slightly higher in the majority of cases.

As treatment, the authors have tried a second or even a third course of ergonovine together with a sulfonamide, but have not obtained uniformly satisfactory results. Their subsequent approach is more active than passive. If by the eighth or ninth postpartum day lochia rubra still persists, unless the temperature is definitely septic in character, a pelvic examination is made. Using a sterile glove, 2 fingers are introduced into the vagina, keeping as close as possible to the symphysis so that the episiotomy will not break down. With the outside hand, the axis of the uterus is straightened, and the second finger is introduced through the open cervix. The fundus is then pushed down so that the uterine cavity may be explored. In nearly all cases a piece of tissue or a marked elevation on the uterine wall can be felt. Unless there is a marked reaction to the pelvic examination, the patient is taken to the operating room the next day. Under anesthesia, a placental forceps is introduced into the uterus, the tissue is grasped and removed, and the uterine cavity is packed. Penicillin is given prophylactically for 48 hours. Following removal of the packing in 24 hours, the temperature usually drops to normal and the patient is, in most instances, discharged on the fifth postoperative day.

From Jan. 1, 1938, to Jan. 1, 1946, the authors have performed 134 postpartum evacuations and packings on 85 private and 49 ward patients. From a study of these patients it appears that age, multiparity, length of labor, method of delivery, mechanism of separation of the placenta, multiple pregnancy or viability of the child, are not important factors in the occurrence of late postpartum bleeding. The postpartum temperature prior to operation was afebrile in 35 cases and febrile in 99 cases. Evacuation and packing were performed on the fifth to the eighteenth postpartum day, usually on the tenth or eleventh day. Following operation the temperature was afebrile in 89 instances and febrile in 45 cases. The average hospital stay of the 134 patients was 17.9 days.

The pathologic report on the tissue removed was degenerating decidua-like tissue, degenerating placenta, chronic metritis, chronic interstitial endometritis or necrotic debris. The fact that true degenerating placenta was found in only 10 cases lends support to Rutherford and Hertig's concept that an important cause of late postpartum bleeding is failure of involution of the placental site itself without retention of placental tissue.

The writers believe that the procedure outlined in this paper lessens the period of morbidity, eliminates a potential danger to the patient, obviates untold annoyance to both patient and physician, shortens hospitalization, and returns the uterus to a healthy status for future pregnancies.

## ANURIA FOLLOWING CRIMINAL ABORTION

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J. Obst. &amp; Gynaec. Brit. Emp., 54: 196-202, 1947

The present communication deals with a case in which changes in the uterus resembling those found in the graver forms of concealed accidental hemorrhage ("uteroplacental apoplexy") were produced by the forcible injection into the birth passages of a mixture of soap and dettol in an effort to produce abortion. The case possesses special interest in that the massive uteroplacental injury so produced was followed rapidly by a breakdown in kidney function with oliguria, azotemia and death.

The patient was a 31 year old single and nulliparous woman who stated that her last menstrual period was on December 25, 1945. The patient attempted to produce abortion by repeated douching daily with soap and water over the preceding month in addition to taking calomel and "female pills." Being unsuccessful she made arrangements to visit an abortionist on March 16—the day of admission. She left home feeling well and went to the house of this person, which was some distance from her home, and there a solution of soap and dettol (2 ounces) with 10 ounces of water was injected at 11 a.m. into the uterus by means of a Higginson syringe with an adapted nozzle adding 2½ inches to its length.

She collapsed immediately and thereafter complained of nagging mesial lower abdominal pain and vomited 3 times. She remained during the day in a more or less collapsed state at the house of the abortionist until 4 p.m., when she was taken home by car. On arrival she was noted to be collapsed. From the onset of her symptoms till her admission to hospital at 8 p.m., that is during 9 hours, she had passed no urine although she had attempted to do so. There had been no vaginal bleeding.

The patient was admitted to the hospital at 8 p.m., on March 16, in a state of shock. The abdomen was tender and rigid, especially in its lower part, and a tender mesial swelling was found rising from the pelvis to within about 2 inches of the umbilicus. The catheter removed 3 ounces of urine which was brownish-red in color. At 12:30 a.m. on March 17, 1946, laparotomy revealed a few ounces of dark sanguineous fluid in the peritoneal cavity. The uterus was enlarged to the size of an 18 weeks pregnancy and had the apoplectic appearance found in concealed accidental hemorrhage. The surface was markedly congested and there were numerous scattered petechial hemorrhages in both anterior and posterior surfaces. There were 2 large areas of subperitoneal ecchymoses on the posterior surface, the one near the fundus and the other low down on the right side. The apoplectic condition was more emphasized on the right than on the left aspect of the uterus. The right fallopian tube and ovary were congested,

purplish black and were regarded as nonviable. The left fallopian tube and ovary were slightly congested. The extravasation of blood extended along the right broad ligament to the wall of the pelvis on the right side and involved the uterovesical pouch and the wall of the bladder. Subtotal hysterectomy and removal of the right fallopian tube and ovary were carried out. It is important to note that the history indicated that these changes in the pelvic organs had evolved during a maximum period of about 131 hours.

Sections through the fundus showed a thin outer rim of surviving uterine muscle fibers transversed by engorged veins; the underlying portion of muscle coat is replaced by an eosinophilic lake of hyaline material richly infiltrated with fatty acid crystals. It may well have consisted of altered muscle fibers and hemolyzed red cells. The veins and arteries traversing this tissue show complete occlusion by granular debris; the arteries being more severely affected than the veins. The picture suggests a local necrosis in the fundus region produced by the inoculum whose fatty acids were well seen in the necrotic tissue and in a few places inside clefts which were probably distended veins. The local arterial occlusion was also probably the result of direct action of the inoculum. Section of the ovary showed enormous dilatation of veins and capillaries and a widespread interstitial hemorrhage of fresh red cells. There were no fatty acid crystals present in the ovary. The hemorrhage could be seen in the corpus luteum and even in the subperitoneal collection of decidual cells. The picture in the ovary was one of hemorrhagic congestion such as is seen in torsion of the pedicle.

The resemblance between the primary uteroplacental lesion found in this case and that occurring in concealed accidental hemorrhage extended to the renal lesion. Many of the loops of Henle contained pigmented debris (cast material), the wide ascending loops showed a regenerating lining epithelium and a lumen plugged by pigmented debris which was covered with a layer of flattened cells. Benzidine staining showed the pigmented cast material to give a positive reaction for hemoglobin. This is the classical picture of a "transfusion" or "crushing injury" kidney. Although this patient received 2 blood transfusions the authors believe that there is no evidence to incriminate them in this case because it seemed clear that the kidneys were gravely embarrassed before the first blood transfusion was administered. During the 9 hours following the injection of the dettol soap mixture only 3 ounces of urine were excreted.

The authors observed that it is not easy to account adequately for the remarkable changes in the uterus and fallopian and ovary. It is likely that the inoculum of soap and dettol introduced under pressure was forced into the large venous channels of the uterus, especially after and separated the edge of the placenta. It is possible that much of the necrosis was due to the direct action of the inoculum. The extensive hemorrhage into the musculature of the uterus and into areas where it is difficult to conceive that the inoculum could pass, for example, the ovary, may possibly be accounted for by the sudden thrombotic blockage of the main vascular channels, especially of the ovarian system. The marked development of the vessels, with a massive concentration of blood towards the placental area, which occurs during pregnancy, makes it not unlikely

that serious and acute interference with one main part of the vascular return may produce rapidly occurring hemorrhage throughout the uterus and the adjacent structures.

The renal lesion is similar to that in the syndrome following crushing injuries and consists of relatively minor changes in the glomerular and first tubular system and of marked degeneration of the second convoluted and collecting tubules in which blood pigment casts of a granular or crystalline nature are present often in considerable quantity. The other conditions in which this lesion is characteristically found are extensive burns and mismatched blood transfusion and it has been described also obstetrical crushing injuries (Young and McMichael, *Brit. M. J.*, 2, 887, 1941). The lesion, in other words, is characteristic of a fairly wide generic group typified by massive tissue damage and it has a special interest for obstetricians in view of the increasing tendency to regard it as deriving, in those members of the group which have been intensively studied, from toxic materials produced at the site of the tissue damage. That there exists a genetic similarity between these varied states is suggested by the identity of the essential clinical and pathological phenomena. There is tissue damage followed quickly by shock, anuria or oliguria, rapidly developing depreciation of tubular function with azotemia, hemoglobinemia and hemoglobinuria and, in severe cases, death from the fifth to the tenth day.

## PENICILLIN AND ACUTE PUERPERAL MASTITIS

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*Am. J. Obst. & Gynec.*, 53: 834-838, 1947

The present report is based upon the experience of treating 73 infected breasts since 1942. The definition of puerperal breast infection was based upon sudden onset of breast pain, chills and hyperpyrexia, high leucocyte count, and usually the finding of a mass in the breast underlying an area of erythema.

Seven of the cases cannot be considered as true instances of puerperal mastitis. These included 2 cases of prepartum breast infection, 3 abscesses in 2 infants one month of age, and 2 cases in which the breast infection was related neither to pregnancy nor lactation.

In the puerperal mastitis group, 18 patients were suffering from abscess when first seen. Sixteen of these required incision and drainage; 2 cleared after aspiration. Forty-eight patients were treated with intramuscular penicillin during the cellulitis phase of the disease with complete resolution in each case. The average hospital stay for these patients was 6.1 days, while the surgically treated group required 42.2 days from onset to complete healing.

The original treatment consisted of a total dosage of 840,000 Oxford units of

penicillin. Twenty-five thousand units were given intramuscularly every 3 hours for 72 hours, and then 15,000 units every 3 hours for 48 hours. Symptomatically, all patients were well after 60 hours of treatment, but, because of the frequency of bacterial "persisters" in staphylococcal infections, it was felt wise to give the full 5-day treatment.

From studies on human milk and blood samples, it was found that the beneficial effects of penicillin in the treatment of human puerperal breast infections are apparently due to the penicillin in the blood stream rather than in the milk. No penicillin was identified in any of the milk specimens.

Breast infection was incident to weaning in 17 patients, and accompanied nursing in the remainder. In the latter cases, lactation was inhibited by the usual measures, including diethylstilbestrol, to prevent reactivation of infection, since the concentration of penicillin attained in breast milk is insufficient to sterilize the milk.

Proper breast hygiene is stressed as a measure of prophylaxis. This must include control of environmental factors as well as attention to the nipple. Penicillin as a spray to the nose and throat of the mothers and attendants has been suggested as a control measure. The author has used penicillin ointment with some benefit to cracked and fissured nipples.

Penicillin is advised for those patients requiring surgical drainage to prevent secondary suppurative foci. Decrease in drainage, pain and induration has been evident from such treatment.

Sulfonamide therapy is not recommended as a substitute for early penicillin therapy; the results obtained in the author's group were disappointing. Of 12 patients treated with sulfonamides during the cellulitis phase, 9 required incision and drainage of an abscess, giving a failure of 75 per cent.

## THE NEWBORN

### NEONATAL DEATHS DUE TO INFECTION

*The Report of a Sub-Committee of the Scientific Advisory Committee*

*Department of Health for Scotland*

Edinburgh: His Majesty's Stationery Office, 1947

The neonatal mortality rate for Scotland during the years 1941 to 1943 was 35.91 per 1000 live births. The amount of this rate attributable to infection is difficult to assess on the basis of death certificates. The rate due to pneumonia was reported as 2.30 during the period, and that due to diarrhea was 1.36, or together 3.66, a figure which amounts to 10 per cent of the total mortality rate. These statistics being based on death certificates are chiefly grounded on clinical diagnoses, as will be shown in the following paragraph. In hospitals where diagnoses are based on autopsy findings, the percentage of deaths due to infection is much higher than the figures just cited.

The causes of death of 618 infants ascertained on postmortem examinations carried out at the Simpson Memorial Maternity Pavilion, Royal Infirmary, Edinburgh, by Dr. Agnes Macgregor, are reported for the years 1939 to 1943 inclusive. Also the causes of death of 217 infants born in the Aberdeen Maternity Hospital during the years 1941 to 1943, based on postmortem examinations done under the supervision of Professor John Young, are reported. These 2 groups of cases are hereafter referred to as the first series and the second series respectively. The important points that emerge from analysis of these autopsies are:

(a) *Part played by Infection.* In the first series 30.7 per cent of the total deaths (190 out of 618) were ascribed to infection; in the second series deaths due to infection were 16.1 per cent of the total (35 out of 217). In addition there was a substantial number of cases in which grave infection was found to be present although not the primary cause of death. When these figures are also taken into account, the incidence of infection found on autopsy was 36.4 per cent in the first series and 20.7 per cent in the second series. A previous survey by Cruickshank of 800 neonatal deaths in a maternity hospital showed that 29.75 per cent were due to infection, other causes such as asphyxia, atelectasis, birth injury, prematurity and gross developmental defects accounting for the remainder.

(b) *Age incidence of Death due to Infection.* Deaths from infection are distributed over the neonatal period. The other principal causes of death—extreme prematurity, malformations, intracranial hemorrhage, asphyxia—destroy life during the first few days, and especially during the first few days after birth. In the first series, some 22 cases are recorded as dying of infection—



mainly pneumonia—within 48 hours of birth, but, having regard to the circumstances surrounding these early deaths from pneumonia, they do not belong to the same category as those which occur later in the first month of life. Ignoring the first 48 hours, during which time the deaths from infection were few in the first series and nil in the second series, the proportion which death from infection bore to that from all causes was 58.7 per cent and 40.2 per cent respectively. When grave infections associated with other causes of death are further included, the incidence of infective conditions becomes 63.6 per cent in the first series and 51.7 per cent in the second series. Further analysis of the cases shows that most of the deaths from infections are referable to the period from the end of the first week to the end of the first month of life.

(c) *Infection in Relation to Prematurity.* In the first series 66 per cent of the deaths due to infections were of premature infants, the corresponding figure being 71 per cent in the second series. Of the total deaths of premature infants occurring after the second day, 63 per cent were due to infection in the first series and 42 per cent in the second series. Infection is thus a major cause of death among prematurely born infants.

(d) *Neonatal Mortality and Prematurity.* The results outlined above show the importance of premature birth as a factor in neonatal mortality in hospitals. In the first series of 618 deaths, 436 or over 70 per cent of the infants were premature, 211 dying within the first 24 hours after birth and 335 within the first week of life. In the second series of 217, the proportion of premature infants was the same, just over 70 per cent. Parsons has pointed out in 1944 that in Birmingham, during the 4 years 1938–1941, when there were 70,402 live births, 54 per cent of the neonatal deaths were of premature infants.

The authors now report comparable figures from a number of other hospitals. The chief difference between these studies of neonatal mortality in individual hospitals lies in the fact that, where habitual resort is made to pathological facilities in determining the cause of death, infection is found to be a more common factor responsible for, or contributing to, a fatal issue than is the case where diagnosis rests upon clinical grounds alone. Of especial interest are the findings on infant deaths at the Royal Maternity Hospital, Glasgow, for the years 1939–1943. When the percentage of newborn deaths due to infection was based on postmortem diagnoses it was from 2 to 3 times higher than when grounded on clinical diagnoses only. This was especially notable in deaths during the first 3 days.

*Incidence of the Infections.* The commoner lethal infections were those of the respiratory tract, nearly always pneumonia, and those of the gastrointestinal tract, including gastroenteritis and severe thrush (esophageal and gastric). Other infections (meningitis and septicemia, including umbilical sepsis) accounted for relatively few deaths. Congenital syphilis was a rare cause. Pneumonia was responsible for most of the mortality and was most frequently present as a secondary cause of death in the first series. Deaths from pneumonia showed fairly even distribution throughout the whole month. Gastroenteritis caused no fatalities before the seventh day, and had its greatest

incidence during the second and third weeks. Calculations based on the first series showed that the mean age at death from pneumonia was 10.84 days, from gastroenteritis 16.58 days, from thrush 15.58 days, from meningitis 9.4 days, and from septicemia 7.8 days.

*Note on Neonatal Pneumonia.* Dr. Agnes Macgregor contributes the following note on pneumonia:

"As certain types of pneumonia are characteristic of, or even peculiar to, the neonatal period, a brief reference is made to these varieties—

(a) Pneumonia causing death in the first week, and in particular during the first three days, usually affects lungs in which an abnormal condition has developed as a result of birth stress, such as atelectasis due to the respiratory depression that accompanies severe asphyxia, or a water-logged state due to excessive aspiration of liquor amnii, which often occurs in cases of fetal asphyxia. The fetus may be infected before or during birth from the maternal passages, or after birth from any environmental source, the infection finding a ready foothold in the abnormal lung tissue. The prevention of this type of pneumonia lies chiefly in the obstetrician's field, as it depends on the prevention or effective treatment of birth asphyxia.

(b) Septic aspiration pneumonia is due to inhalation either of milk during feeding, or of regurgitated stomach contents. It is characterized by a severe destructive inflammation in and around the bronchi, often going on to suppuration. It is a feature of the neonatal period, being met with much less often in older infants; it is common in the newly-born, and is a risk to be kept in mind in the feeding and nursing of infants.

(c) Staphylococcal pneumonia is commoner in the neonatal period than at any other time of life. It produces a rapidly developing suppuration, beginning in the bronchi, from which it spreads to involve larger areas of the lungs in total disorganization. It is sometimes caused by septic aspiration and sometimes arises from infection transferred from without, and may appear in association with outbreaks of other forms of staphylococcal infection in the nurseries.

(d) Bronchopneumonia, due to air-borne infection originating in the upper respiratory tract or bronchi, has the same pathological features as bronchopneumonia in older infants. It may be caused by the common pathogenic organisms of the respiratory tract—streptococcus hemolyticus, pneumococcus, *H. influenzae*. In the neonatal period, however, it is not infrequently due to infection with common organisms that do not cause pneumonia in older subjects, notably those of the *B. coli* group."

The clinical picture of pneumonia in the newborn tends to be negative and confusing. It is negative because in most cases there is absence of cough, obvious dyspnea and fever; it is confusing when the presence of cyanosis suggests asphyxia or intracranial hemorrhage. The majority of fatal pneumonic infections occur in premature infants and are closely related to early faults in the functioning of the lungs.

*Epidemic Diarrhea of the Newborn.* A rather extensive review of the literature is made on this disease as it has been reported in the United States, Canada

England and Scotland. The aggregate case mortality in the United States varied between 42 and 47 per cent. In 4 Canadian hospitals, the case mortalities were 40 per cent. Three outbreaks in hospitals in England are described by Ormiston with an aggregate case mortality of 29 per cent (Lancet 2: 588, 1941).

Similar mortality figures are reported for outbreaks of epidemic diarrhea of the newborn in Scotland. Professor McNeil, in a note to the Sub-Committee, quotes his experience at the Simpson Memorial Maternity Pavilion, Royal Infirmary, Edinburgh, during the 4 years 1940-1943, when 137 cases occurred with 64 deaths, due either to the original infection or to superadded acute pneumonia. Of these cases, 59 occurred in premature babies and 78 in full term infants, the case mortalities being 57.6 per cent in the former group and 38.4 per cent in the latter group. The case incidence was 0.7 per cent among the mature infants and 7 per cent in the premature infants. Symptoms of onset were not noted in any case before the third day, but the onset occurred in one-third of all the cases from the third to the seventh day.

In Ormiston's series of cases of gastroenteritis, he found that, in one hospital, 14 per cent of 51 sick infants who were entirely breast fed died, as contrasted with 60 per cent of 30 infants who were artificially fed with or without breast milk. In an outbreak in another hospital he found that all the affected babies were bottle fed with cow's milk mixtures when they developed the disease, and that the case mortality was 38 per cent. This is one example, among many, of the capacity of the breast-fed infant to resist infection, in whom it is less frequent and less severe.

*Minor Infections.* The newborn infant does not appear to possess a developed resistance to organisms which are commonly found as saprophytes on the adult skin and mucous membranes. In particular, staphylococcal infections of the skin may take the form of small localized "septic spots" or vesicles, umbilical lesions, paronychia or boils, and may give rise to conjunctivitis. A danger to the infected child is that a mild skin infection may become acute or generalized, developing into more serious conditions such as bullous impetigo, dermatitis, pemphigus, or into a rapidly fatal septicemia. A danger to the other infants in the nursery is the possible spread of these surface infections in the form of outbreaks, an occurrence which is not uncommon. Consequently, the earliest sign of such a surface infection, however slight, should be watched for and noted, in order that preventive treatment can be undertaken at once.

As regards the incidence of all forms of infection, Professor McNeil, in a personal communication, gives a figure of approximately 20 per cent among 13,309 infants at risk over a period of 5 years from 1939 to 1943, in the Simpson Memorial Maternity Pavilion. The commoner sites of infection were: the conjunctiva (6.6 per cent), the skin (5.6 per cent), the upper respiratory tract (thrush, 4.6 per cent) and the lower respiratory tract (pneumonia, 1.4 per cent). In a maternity hospital in England, Corner in 1946, reporting on the incidence of infections of all descriptions, however slight, quotes a figure of 25.3 per cent of all babies in one hospital and 29.7 per cent in a second hospital. The most

incidence during the second and third weeks. Calculations based on the first series showed that the mean age at death from pneumonia was 10.84 days, from gastroenteritis 16.58 days, from thrush 15.58 days, from meningitis 9.4 days, and from septicemia 7.8 days.

*Note on Neonatal Pneumonia.* Dr. Agnes Macgregor contributes the following note on pneumonia:

"As certain types of pneumonia are characteristic of, or even peculiar to, the neonatal period, a brief reference is made to these varieties—

(a) Pneumonia causing death in the first week, and in particular during the first three days, usually affects lungs in which an abnormal condition has developed as a result of birth stress, such as atelectasis due to the respiratory depression that accompanies severe asphyxia, or a water-logged state due to excessive aspiration of liquor amnii, which often occurs in cases of fetal asphyxia. The fetus may be infected before or during birth from the maternal passages, or after birth from any environmental source, the infection finding a ready foothold in the abnormal lung tissue. The prevention of this type of pneumonia lies chiefly in the obstetrician's field, as it depends on the prevention or effective treatment of birth asphyxia.

(b) Septic aspiration pneumonia is due to inhalation either of milk during feeding, or of regurgitated stomach contents. It is characterized by a severe destructive inflammation in and around the bronchi, often going on to suppuration. It is a feature of the neonatal period, being met with much less often in older infants; it is common in the newly-born, and is a risk to be kept in mind in the feeding and nursing of infants.

(c) Staphylococcal pneumonia is commoner in the neonatal period than at any other time of life. It produces a rapidly developing suppuration, beginning in the bronchi, from which it spreads to involve larger areas of the lungs in total disorganization. It is sometimes caused by septic aspiration and sometimes arises from infection transferred from without, and may appear in association with outbreaks of other forms of staphylococcal infection in the nurseries.

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common sites were the conjunctiva, the skin and the mouth and the nose. The incidence of many of these infections has been reduced greatly by the use of penicillin.

In sum, the evidence as presented is clear that infection in infants in maternity hospitals, especially in the premature group, may appear and run its course without being recognized either as a cause of sickness or death or as an unwitting source of spread, because of the highly elusive nature of the signs and symptoms. "The occurrence of infection is facilitated by the poor response which the infants' tissues make to invading bacteria of low virulence. This poor response is probably related to the immaturity of the defence mechanism" —(Cruikshank, 1945). These considerations furnish the strongest argument for a regime of infant care calculated to secure the greatest possible protection against infection, continuously revised as to its details in the light of experience, so as to make it as simple as possible and yet reliable.

The amount of infection likely to occur in the nurseries is least in those institutions in which the beds are reserved for booked cases without overcrowding, and which serve areas where most of the mothers are well nourished. On the other hand, conditions least favorable to the prevention of infection are to be found in the large central hospitals in the cities, which are called upon to treat a relatively high proportion of abnormal and emergency cases and cases of prematurity, and which for the most part serve poor class districts where many of the mothers are under-nourished and overcrowding is difficult to avoid owing to pressure on accommodation. In these hospitals, as compared with the former, the neonatal mortality during the first day or two of life is higher, while the risk of infection after that period is enhanced because of the presence of larger numbers of infants with poor resistance and low vitality. The contrast is further reflected in the inability of many of the mothers to breast-feed their infants successfully, a factor which has an important bearing on the prevention of infection. It is under these conditions that the most rigid standards of care should be exercised in the nurseries and the greatest attention paid to staffing and planning.

The article concludes with a discussion of the bacteriology of the newborn by Dr. G. B. Ludlam and a long section on the nursery and the care of newborn infants. Some of the recommendations made are as follows:

1. The large nursery of 20 to 30 cribs should be avoided in favor of a suite of smaller nursery units or wards preferably holding from 4 to 6 cribs, and allowing at least 40 square feet of space per crib; each infant should have its own portable bath and locker (attached to its crib) containing towels, soap and other necessary equipment,—that is, individual rather than communal care is urged.
2. Proper isolation facilities are mandatory, including a nursery for healthy infants, another for sick infants, and still another for premature infants, along with separate isolation provisions for infective conditions.
3. Nurses who change infants' napkins (or otherwise deal with excreta or with septic conditions) should not prepare or give infants feeds. In whatever way duties are arranged, however, it is of the utmost importance that every

nurse should wash her hands thoroughly (a) before preparing a feed; (b) after changing an infant; (c) before giving a feed; furthermore she should wear a face mask throughout.

4. Of greatest importance is a highly skilled nursing staff, adequate in number. One nurse to every one and a half premature infants on a 24 hour basis is recommended.

## Rh INCOMPATIBILITY AND FOETAL PROGNOSIS

Z. POLISHUK

*Rothschild Hadassah University*

Acta med. orient., 5: 234-236, 1946

A case is presented in which the mother, a known Rh negative, gave a history of 2 previous pregnancies, both of which resulted in living babies which died within 24 hours after delivery. The husband and both of the paternal grandparents were Rh positive. With the present pregnancy, the mother had an initial Rh antibody titre at the second month of 1:32. At the eighth month the titre had fallen to 1:4. The pregnancy was uneventful and the patient delivered a living healthy baby who was found to be type O, Rh negative. The child was perfectly normal 10 days later at discharge.

The author concludes from this case that a history of erythroblastotic or still-born children in an Rh incompatible couple increases the chances for a favorable fetal prognosis when the father is heterozygous. Even though the husband and the husband's parents are Rh positive, the father still has a chance of being Rh positive heterozygous. If one of his parents is Rh negative, he will surely be heterozygous. In addition, the presence of anti Rh agglutinins during pregnancy does not always imply an unfavorable prognosis for the child, for often these agglutinins can be ascribed to a previous pregnancy or Rh positive blood transfusion.

Polishuk also feels that the importance attached to Rh incompatibility in married couples has been unduly exaggerated. In 5200 cases seen at the Rothschild Hadassah University Hospital, only 5 cases of neonatal morbidity and mortality were due to Rh incompatibility.

common sites were the conjunctiva, the skin and the mouth and the nose. The incidence of many of these infections has been reduced greatly by the use of penicillin.

In sum, the evidence as presented is clear that infection in infants in maternity hospitals, especially in the premature group, may appear and run its course without being recognized either as a cause of sickness or death or as an unwitting source of spread, because of the highly elusive nature of the signs and symptoms. "The occurrence of infection is facilitated by the poor response which the infants' tissues make to invading bacteria of low virulence. This poor response is probably related to the immaturity of the defence mechanism" —(Cruickshank, 1945). These considerations furnish the strongest argument for a regime of infant care calculated to secure the greatest possible protection against infection, continuously revised as to its details in the light of experience, so as to make it as simple as possible and yet reliable.

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MULTIPLE CONGENITAL DEFECTS FOLLOWING  
MATERNAL VARICELLA; REPORT OF A CASE

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*Cambridge and Boston*

New England J. Med., 236: 534-537, 1947

The suspicion is growing that the incidence of congenital malformation following other maternal prenatal virus infections parallels that associated with rubella. In the case reported in this paper, maternal varicella occurring in the eighth week of pregnancy was followed by delivery of a child with extensive congenital defects.

A 6-hour-old infant was admitted to the hospital because the attending physician had detected an anomaly of the right leg. So far as could be ascertained, there was no family history of congenital anomalies. The 23-year-old mother of the infant had contracted varicella in the eighth week of pregnancy when she was "covered from head to foot" with lesions and had a temperature of 102 degrees F. for 2 weeks. A normal 3-year-old sibling of the patient had also had varicella synchronously with the mother.

On examination, the skin was normal except for several well defined reddish pigmented areas on the medial aspect of the left thigh and leg. The external penitalia appeared normal except for an undescended left testicle, but urine gribbled constantly. The anal sphincter was relaxed and widely patent, precluding a continuous fecal discharge. The right lower leg was thin and underdeveloped, and there was a right talipes equinovarus. The toes of the right foot were underdeveloped, the terminal phalanges being represented only by small horny pegs. In the lumbar region there was a longitudinal depression, 3 cm. in length and 0.5 cm. in depth, that was free of discharge.

X-ray studies, lumbar puncture, bilateral subdural taps and a pneumoencephalogram were performed. The patient had 2 episodes of diarrhea which responded to therapy with fluids and sulfadiazine. At about 3 months of age, he developed nuchal rigidity, convulsions, spastic movements of the extremities, opisthotonos and elevated temperature without, however, exhibiting bulging fontanels. At about 5 months of age, there was a sudden appearance and remission of spasticity, vomiting and bulging fontanels, not due to meningitis. The patient was discharged at 6 months of age.

Although a purely pathological diagnosis is not feasible in this case, it may prove interesting to list the defects that may, as a result of study of this case, be considered to have been present. They were: talipes equinovarus, right; paralysis and muscular atrophy, right lower extremity; defective development, toes of right foot; cortical atrophy; hypoplasia or aplasia of cerebellum; ? internal hydrocephalus; bilateral optic atrophy; pilonidal sinus; torticollis to right; cicatricial (? post-varicella) lesions, skin of left lower extremity; unde-

## Rh INCOMPATIBILITY IN HETEROSPECIFIC PREGNANCY

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Am. J. Clin. Path., 16: 574-579, 1946

There has been a tendency, since the discovery of the blood groups, to associate heterospecific pregnancies with pathological conditions in both the mother and child. In icterus precox, incompatibilities between the blood groups of the mother and child have been demonstrated, and a rising titre of isoagglutinins has been found in these cases. However, even should maternal isoantibodies of the A-B-O group pass the placental barrier, the following factors tend to annul or decrease the severity of a hemolytic process: (1) a lowered sensitivity of fetal erythrocytes to the action of isoantibodies; (2) titration of anti-A and anti-B agglutinins at body temperature gives much lower titres for these agglutinins than at room temperature; and (3) group specific substances in secretors are able to absorb incompatible agglutinins crossing the placental barrier.

The authors present 2 cases in which there existed an incompatibility of the Rh factor and of the A-B-O blood groups. In the first case the mother was O Rh-negative and the husband A Rh-positive. There was a rising titre of anti-Rh agglutinins and conglutinins and of anti-A and anti-B during the prenatal course. The pregnancy terminated in a stillborn baby. After delivery of the stillbirth there was a prompt fall in the anti-Rh agglutinins and conglutinins, but the anti-A and anti-B titre rose after fetal death and remained elevated for one month.

The second case was that of a mother who was O Rh<sub>0</sub> and a father who was A Rh<sub>1</sub>. A live child was delivered by cesarean section who was A Rh<sub>1</sub> and who on the third postpartum day developed a mild jaundice which cleared without therapy. This mother's serum contained anti-Rh conglutinins of 1:8 and anti-A agglutinins of 1:4096. One month after delivery the anti-A agglutinins were still 1:4096.

It was felt that the antibodies to the A-B-O blood groups had no harmful effects in these 2 cases, but that the weaker anti-Rh agglutinins were responsible for the hemolysis in the infants. However, their presence as the initial antibody may have been responsible for suppression of the formation of anti-Rh agglutinins. The authors felt that if isoimmunization could produce hemolytic effects in the newborn, a greater incidence of cases of hemolytic disease in heterospecific pregnancy would be found.

# OPERATIVE OBSTETRICS

## FAILED FORCEPS

J. K. FEENEY

*Dublin, Ireland*

Irish Journal of Medical Science, 6th Series, 257, 190-210, 1947

Thirty recent reports, giving details of 70,000 deliveries in the 3 Dublin hospitals were studied and information obtained on 121 cases of failed forceps; in 77 cases failure occurred outside the hospital, for the most part in the home, while in 44 cases the unsuccessful forceps attempt took place in the hospital.

### *I. Details of Cases of Failed Forceps Admitted from Outside the Hospitals*

The first part of the paper deals with 77 cases of failed forceps admitted as such to the hospital. The cases are classified on an etiological basis as: (1) abnormal cephalic presentations; (2) hydrocephalus; (3) cases in which the conditions for outlet forceps were not fulfilled; (4) cases in which cephalopelvic disproportion appeared to have been an important factor; and (5) constriction ring dystocia.

*Abnormal cephalic presentations.* These comprised 17 cases, 15 of brow presentation and 2 of face. Six of the patients were primigravidae, 11 multiparae. On admission 7 were in poor condition due either to shock or infection. In 4, or in almost one-fourth, the cervix was not fully dilated on admission. Six patients had contracted pelvis. Seven cases were managed in the hospital by manual conversion, but in 5 craniotomy was necessary and in 3 some form of cesarean section. Four mothers died (23.5 per cent) and 13 infants (76.5 per cent).

Although it is just possible, the author comments, that the original presentation in some of these cases had been vertex, deflexion of the head being produced by attempted delivery with forceps and internal manipulation, it is apparent that the practitioners who attended these patients in the first instance were at fault in most of them. It would appear that the conditions for the safe low forceps delivery of domiciliary practice were not fulfilled (i.e. cervix fully dilated and taken up, vertex presentation, greatest engaging diameter through the pelvic inlet with the head well down on the pelvic floor). The doctors in attendance failed to appreciate that a high head after a long labor, especially in a multiparous patient, signifies a serious abnormality, or they failed to diagnose a brow presentation which in the absence of a very careful examination is liable to be missed. The high maternal and fetal mortality rates confirm the seriousness of failed forceps in abnormal cephalic presentations.

*Hydrocephalus.* There were six cases of failed forceps attributable to hydrocephalus, all but 1 in multiparae. These patients also were in poor condition

scended testicle, left; and insufficiency of anal and vesical sphincters. In addition, defects of a preponderantly physiologic nature were noted: hyperirritability of central nervous system, poorly functioning thermoregulatory ability and an apparent increased susceptibility to infection.

The authors review the present opinion on the pathogenesis of anomalies associated with maternal prenatal virus infection. The possible teratogenic propensities of maternal virus diseases occurring early in pregnancy are emphasized.

lesson of this is that practitioners should inquire into the duration of previous labors, the mode of delivery and the weight of babies before they undertake the delivery of parous patients. Patients in whom the occurrence of dystocia is foreseen should not be delivered in their own homes. Nine cesarean sections were performed in this group after admission to the hospital, 8 low cervical sections, 1 extraperitoneal section and 1 cesarean hysterectomy. There were no deaths in the cesarean section group but 3 patients died following vaginal delivery, 2 of infection and 1 of shock.

*Constriction Ring Dystocia.* Two patients fell into this group, both having had 30 hours of labor on the outside and failed forceps. In both cases forceps also failed in the hospital and in one cesarean hysterectomy was carried out, and in the other low cervical section. Both patients made a satisfactory recovery.

In commenting upon the above series of 77 cases in which forceps failed on the outside, the writer makes it clear that he appreciates the difficulty with which the practitioner has to contend in domiciliary obstetrical practice. Pressure of work, loss of sleep, lack of facilities and the insistence of the patient, unrelieved of pain, and the relatives, may all play their part in deciding him to attempt delivery at the earliest possible opportunity. Nevertheless, it must be noted that too often the forceps is prematurely applied; in the 77 cases under discussion it was contraindicated in 60 (78 per cent), at least at the time when the delivery was first attempted; in just one-half of the cases the cervix was not fully dilated.

## *II. Patients on Whom Forceps Was Applied for the First Time in Hospital, but Delivery Could Not Be Effected by the Instrument*

There were a total of 44 cases in this group, 28 primigravidae and 16 multigravidae. By far the commonest cause of failed forceps among these patients was contracted pelvis, this condition being present in 26 of the 28 primigravidae and in 7 of the 16 multigravidae. Pelves with reduced mid-strait and outlet capacity figure prominently. The more common methods of delivery employed in this group of patients after the forceps had failed were as follows: craniotomy or embryotomy—12 cases, lower segment section—12 cases, pubiotomy—3 cases, symphysiotomy—3 cases and cesarean hysterectomy—3 cases. There were 3 maternal deaths in these 44 cases, 2 due to sepsis following vaginal delivery and the third attributable to inhalation of stomach contents during the anesthetic for the attempted application of forceps. In this third case low cervical section was employed for delivery following the failed forceps.

In addition to the 121 cases taken from the Dublin Maternity Reports and analyzed above, the author has collected 225 additional cases reported in recent British and American literature; this affords a total of 346 cases of failed forceps with a combined maternal mortality rate of 11 per cent or 1 death in 9 cases. This is a sobering thought for the practitioner to bear in mind. Very few of the major surgical procedures carry such a high death rate. It is a pity that such a beautifully constructed instrument as the midwifery forceps can be so lethal in its misuse.

on admission, 2 showing pyrexia, 1 shock, 2 threatened rupture of the uterus and 1 actual rupture. In 1 case the cervix was not fully dilated. There was 1 maternal death in this group, a patient who after 5 days of labor had a futile forceps attempt made on the outside and was admitted to the hospital with a temperature of 103°F., a pulse of 120 and a tender uterus. After perforation and drainage spontaneous delivery occurred within five hours, but the patient succumbed 18 days later from puerperal infection.

In commenting on this group of cases the author observed that hydrocephalus, especially minor degrees of the abnormality, may easily be overlooked as a cause of dystocia. The lower segment of the uterus after a long labor is so stretched and tense that palpation of the enlarged head is difficult. On vaginal examination, he has seen the condition mistaken for a large caput in one case and for unruptured membranes in two. If a careful examination is carried out, it will be noted that the presenting part is high (which should in itself preclude the application of forceps) and that the sutures and fontanelles are widely separated. Hydrocephalus is variously estimated as being responsible for 10 to 20 per cent of all cases of rupture of the uterus.

*Cases In Which the Reason for Failure to Deliver with Forceps Appeared To Be That the Conditions for Low Forceps Application of Domiciliary Practice Were Not Present.* The pelvis in these cases was considered normal or nearly normal, but the cervix was not fully dilated and/or the head had not descended to the outlet and/or was not rotated. There were 28 cases in this group, 21 primigravidae and 7 multiparae. The cervix on admission to the hospital was fully dilated in only 8. Many patients on admission showed extensive lacerations of the fornix, cervix and vagina, and in addition 3 patients had rupture of the uterus. Time and low forceps or spontaneous delivery took care of most of these cases. Five mothers died (17.8 per cent) and 15 babies (53.5 per cent).

In most of these cases, the author commented, forceps should not have been employed in domiciliary practice, at least not at the time when the application was attempted in the first instance. The cervix was not fully dilated in 20 of the 28 cases. In 5 cases the difficulty was due to the fact that failure of rotation was missed or its significance not appreciated. The practitioner should remember that the degree of internal rotation is nearly of as much importance in assessing suitability for forceps delivery as the level in the pelvis at which the head lies. It would appear that in midpelvic forceps the blades are too often casually applied to the sides of the pelvis, irrespective of the degree of rotation, in the hope that they will lock and that rotation and delivery may be effected by strong traction.

*Cases in Which Disproportion between the Presenting Head and the Maternal Pelvis Was Strongly Suggested by:—(a) Previous and Present Obstetrical History of the Patient; (b) the Mode of Delivery in Hospital; (c) Clinical and/or Radiological Examination of the Pelvis in Hospital, and (d) the Weight of the Baby.* There were 24 cases in this group, 9 primigravidae and 15 multigravidae. In 13 of the 24 cases the cervix was not fully dilated on admission to the hospital. Attention is directed to the occurrence of disproportion in 15 multigravidae. The

There were 47 cases of toxemias, with 44 per cent morbidity. The morbid cases had an average labor twice as long as in the nonmorbid cases, the babies averaged 300 Gm. less in the morbid cases, and cervical laceration was acquired in about 3 times as many of the morbid cases as in the nonmorbid. The non-morbid cases were induced closer to the time of spontaneous initiation of labor, and their babies were more matured.

There were 31 cases of disproportion, with 60 per cent morbidity. The hours of labor were almost 4 times as long in the morbid as in the nonmorbid cases and twice as many of the morbid cases acquired cervical lacerations. It seems that induction of premature labor, in the management of a contracted pelvis, should not be considered a justifiable procedure.

There were 14 cases of ruptured membranes not followed by induction of labor within 12 hours, with 80 per cent morbidity, stressing the danger in such a situation. In addition to the high morbidity, there was a maternal mortality of 21 per cent and a fetal mortality of 20 per cent. Ninety per cent of the morbid group and 50 per cent of the nonmorbid acquired cervical lacerations. Labor averaged 25 hours for the morbid and 20 hours for the nonmorbid group. Birth weights of the babies in the nonmorbid group were 800 Gm. higher than in the morbid group.

There were 109 cases of postmaturity, as to estimated date of confinement, with 25 per cent morbidity. This was rather surprising, as one could reason that these patients should be prepared for labor. However, uterine dystocia was present in about 10 per cent of cases. It is concluded that postmaturity, as to estimated date of confinement, is not a reliable diagnosis.

There were 168 cases in which labor was induced more than 2 days before the estimated date of confinement, with 18 per cent morbidity. For the most part, these were convenient inductions, without indications of toxemia, disproportion or spontaneous rupture of membranes. Most of the morbidity was due to intracranial injury and prolapsed cord. It is thought that the lower morbidity rate in this series, as compared to the postmature group, could be explained by the fact that in the postmature group, failure to induce was taken more seriously and mechanical means were resorted to; in the present group failure to induce was not taken seriously and another attempt was made nearer the threshold of spontaneous labor.

There were 131 cases in which elective induction took place at the estimated date of confinement, plus or minus 2 days, with 14 per cent morbidity. It is quite logical that elective induction at this time, excluding toxemias, disproportion and spontaneous rupture of membranes which failed to induce within 12 hours, would yield the lowest morbidity.

It seems that the only reliable clinical means available at the present time as to whether a patient is crossing the threshold of labor is the condition of her cervix. The theory of the onset of labor as having a hormonal etiology which causes softening, thinning and dilatation is borne out by clinical observations. It would be expected that if labor were induced when such changes were present, labor would proceed normally without laceration or cervical injury, not

(At the cost of many mothers' lives this series of cases drives home, as few other studies have, the relentless toll exacted by premature and injudicious forceps. In the author's sympathetic comment on the plight of the general practitioner he cites as one of the main causes of premature forceps the "insistence of the patient, unrelieved of pain." Herein, of course, lies one of the greatest contributions of modern analgesia. By doing away with the importunities of the patient it stays interference until interference is safe. In weighing the pros and cons of analgesia the countless mothers and babies which have been saved in this manner are sometimes overlooked.

While many of the injunctions in this article apply chiefly to the general practitioner, obstetricians everywhere can note with profit the 45 cases in which forceps failed in Dublin Maternity Hospitals at the hands of specialists and their assistants. In 35 of these cases it was at the midpelvic plane that the forceps failed; and the most frequent cause of failure was midpelvic and/or outlet contraction. The very important topic of midpelvic contraction was discussed in the August issue of the Survey in a comment on Eller and Mengert's article.—Ed.)

## MORBIDITY ASSOCIATED WITH INDUCTION OF LABOR

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*Am. J. Obst. & Gynec., 53: 382-404, 1947*

The material for this study comprised a total of 500 cases of induced labor. Of this total, 160 cases were taken from Barnes Hospital and constituted all inductions from June, 1925, to July, 1927, an incidence of 8.3 per cent of parturient admissions of at least 36 weeks' gestation. For the most part, elective rupture of membranes was used but rarely. The combined maternal and fetal morbidity was 20 per cent. A second group of 140 selected cases from the St. Louis Maternity Hospital was chosen to show the morbidity associated with combining pituitary extract, castor oil, quinine, bags and bougies, with the addition of artificially ruptured membranes. The incidence of induction was 13.5 per cent, and the combined maternal and fetal morbidity was 40 per cent. The third group of cases comprised all inductions at the St. Louis Maternity Hospital in 1944. The incidence of induction was 10.2 per cent for the private service; 0.8 per cent for the ward service. Combined maternal and fetal morbidity was 20 per cent. Fifty additional private cases from 1943 were induced by elective rupture of the membranes and pituitary extract, only if needed. Combined maternal and fetal morbidity in this group was 8 per cent. The entire 500 cases were then subjected to critical analysis.

There were 166 primigravida and 334 multipara. The fact that there was 41 per cent morbidity in the primigravida group shows the danger of inducing a woman in her first pregnancy. As to age, there was a definite higher morbidity in the younger women up to 25 years of age.



of 731,690 deliveries in which the incidence of cesarean section and of cesarean section with hysterectomy is also given. In the 731,690 deliveries the incidence of cesarean section was 3.42 per cent. There were 25,027 cesarean sections reported and hysterectomy was performed 636 times, once in every 39 cesarean sections, an incidence of 2.54 per cent. This represents one cesarean hysterectomy in every 1150 deliveries. The average mortality was 5.2 per cent.

In Reis and DeCosta's series of 54 cesarean hysterectomies, uterine fibroids (25) were the prime indication. In 11 of these 25 the fibroids were uncomplicated but of such number, location or size that it was felt safer to perform an elective cesarean hysterectomy at term than to permit the patient to labor and subject her to a subsequent hysterectomy. Six women with fibroids had had a previous cesarean section; 3 had fibroids and prolonged labor; 2 had fibroids obstructing the birth canal, and in 3 others fibroids were associated with toxemia or placenta previa. Cesarean hysterectomy was performed in 15 patients for uterine bleeding. Of these 6 had uncontrollable bleeding at the time of cesarean section, 5 had abruptio placentae, 3 had placenta previa and one had a placenta accreta. The operation was performed 4 times for pre-eclamptic toxemia and only 4 times for intrapartum infection.

The age of the patient varied from 24 to 41, with 32 patients more than 34 years old. The average age was 34.2 years. Hysterectomy was performed 16 times in primiparas but over half of these patients were more than 34 years old. The indication was fibroids in 12 of these 16, revealing that as older women become pregnant, pregnancy is more apt to become complicated by conditions arising in the older age group.

In the authors' series cesarean hysterectomy was performed in 54 of 1202 cesarean sections, an incidence of 4.5 per cent. There were, during this period, 33,214 deliveries, the incidence of cesarean section being 5.18 per cent. Three patients died after cesarean sections, an incidence of 0.25 per cent. However, there were no deaths in the last 675 cesarean sections, covering a period of 6 years. There were no deaths following cesarean hysterectomy. Twenty-one of the 54 patients had a temperature of 101 F. or over, exclusive of the first 24 hours. In one patient a pelvic abscess subsequently developed which was drained vaginally. This morbidity rate is less than following cesarean section. Removal of the uterus removes the potentially infected thrombotic area of placentation, sloughing of the decidua is eliminated, involution of the uterus is eliminated and a short incision with opportunity for spontaneous drainage is substituted for the longer buried uterine incision. Five babies were still born, all associated with abruptio placentae. One live born infant died on the second day; the mother had pre-eclamptic toxemia.

The authors feel that less difficulty should be encountered in cesarean hysterectomy than in the usual abdominal hysterectomy because of the greater mobility of the uterus. They distinguish between "elective" cesarean hysterectomy and "nonelective." In the former removal of the uterus is anticipated prior to its incision while in the latter hysterectomy becomes a necessary procedure during the course of the operation. They routinely performed the

because of the method of induction used, but because of the prepared condition of the lower uterine segment and cervix.

The writer subgroups the morbid cases only into acute endometritis, hemorrhage and transfusion. In no group did the incidence of hemorrhage exceed the incidence of acute endometritis by more than one per cent. In the toxemia and contracted pelvis groups the incidence of infection was greater than the hemorrhage incidence. In ruptured membranes not followed by induced labor within 12 hours, the highest incidence of infection and hemorrhage was found (30 per cent each).

The results of a study of those cases which failed to induce (13 per cent of the 500 cases studied) reveal that the groups contracted pelvis-pelvic disproportion; toxemia; ruptured membranes not productive of labor within 12 hours; and antemature (more than 2 days before the estimated date of confinement), show from 35 per cent to 11 per cent of all such cases failed to induce, while 9 per cent of the postmature and 9 per cent of the plus or minus 2 days of the estimated date of confinement failed to induce.

From this study, it has been shown that there can be severe morbidity incurred with the induction of labor. The increase in morbidity is caused by forcing labor before the cervix, lower uterine segment and uterus have been prepared for labor. The character and results of induced labor approach that of natural spontaneous labor only when the induced labor precedes by 48 hours or less the time when spontaneous labor would have occurred anyway. This means that induction of labor has obstetric usage mainly in the management of the toxemia patient, including the diabetic. For the management of contracted pelvis, pelvic disproportion, induction has little or no usage. For the management of postmaturity, induction has little or no usage.

Induction of labor after spontaneous rupture of the membranes may be a dangerous procedure.

The morbidity incurred by induction of labor must be evaluated against any questionable advantages of such management.

Elective induction of labor, which would have occurred in 24 to 48 hours later, gives little or no morbidity. Such elective induction is of little or no obstetrical advantage, but rather has convenience and order as its justification.

## CESAREAN HYSTERECTOMY

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J. A. M. A., 134, 775-779, 1947

This study was undertaken to determine the present status of cesarean hysterectomy. The American literature for the period 1931 to 1945 includes reports

against puerperal infection, cesarean hysterectomy or extraperitoneal cesarean section, I would lean toward the former because it protects against all forms of extension (peritonitis, pyema, perimetritis, bacteremia, etc.) while the latter is preventive only against peritonitis. I hasten to say, however, that a number of authorities would disagree quite stoutly with me on this point. There is also considerable disagreement about the possible role of penicillin in reducing the need for these operations in intrapartum infection. It has been our experience that this agent has accomplished this end in many cases, but final evaluation of this question must await further observation.

The place, if any, of cesarean hysterectomy simply for sterilization will be discussed in an editorial note appended to the next abstract.—Ed.)

## THE PROBLEM OF THE REPEAT CESAREAN SECTION—A PRELIMINARY STUDY

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On the basis of an extensive review of the literature (covering 51 references) together with his own experience, the author advances two tenets; (1) Repeat cesarean section is more dangerous than primary and becomes successively more dangerous with each operation. He estimates that the actual mortality figures with modern technique will approximate 1 to 1.5 per cent in repeat sections, being higher when the previous section has been classical, because of adhesions. (2) The procedure which will most surely lessen the immediate and remote dangers of the repeat section is cesarean hysterectomy, an operation which he deems much superior to cesarean section and tubal ligation. In his opinion the mortality of elective cesarean hysterectomy should be well under 0.5 per cent, whereas as indicated above, that of repeat section with tubal ligation approximates 1.5 per cent,—a saving of 1 per cent by extirpation of the uterus. Other advantages are: it is simple of performance; it has a low morbidity and recovery is more prompt and less painful; it is a complete protection against operative and postoperative hemorrhage; it greatly reduces the risk of sepsis and peritonitis. Contrariwise, when cesarean section plus tubal ligation is carried out, the mortality and morbidity are not only high but, for the sake of the dubious advantage of menstruation, an organ robbed of its reason for existence is allowed to remain as a possible prey to pathologic changes. This bespeaks a shortsighted surgical vision dimmed by a false sentimentalism.

Believing that cesarean hysterectomy is safer than cesarean section with tubal ligation and that the difference is probably 1 per cent, the opinion of a Catholic moral theologian was obtained in order not to transgress the religious beliefs and rights of Catholic patients. Ford believes that a difference of 1 per

typical laparotrachelotomy with longitudinal incision of the lower uterine segment. For the elective cesarean hysterectomy the procedure is identical except that after the reflected peritoneum has been freed the transverse incision in the lower uterine segment is substituted for the longitudinal incision. The baby is delivered through this transverse incision in the lower uterine segment. The umbilical cord is clamped and ligated, and the placenta is allowed to remain in situ. After clamping and cutting the usual ligaments and vessels hysterectomy is then carried out by extending the transverse uterine incision posteriorly.

(Prefaced to this report is an extensive and valuable review of the early history of cesarean hysterectomy in which it is pointed out that this procedure was considered and actually performed some years prior to Porro's first operation in 1876. In their consideration of Porro's contribution, Reis and DeCosta make special note of the fact that the original Porro procedure differed greatly from modern cesarean hysterectomy in that its basic techniques comprised: (1) the complete ablation of the uterus and its appendages accomplished by the use of some type of occluding ligature, often metallic; (2) the external placement of the uterine pedicle (marsupialization), and (3) the employment of cul-de-sac and/or abdominal drainage. Since the above article stresses these fundamental differences, this might be the proper time and place to deprecate the continued and wide-spread employment of the term "Porro section" for cesarean hysterectomy. The latter name is not only more correct but is self-explanatory and might well supplant entirely the older appellation.

This paper raises a question which is coming very much to the fore these days, namely: What may be considered proper indications for hysterectomy following cesarean section? Concerning its justification in ruptured uterus and in stubborn uterine relaxation associated with abruptio, there can be little argument. However, other indications are more debatable. For instance, when do myomata call for hysterectomy after cesarean section? What about cesarean section versus extraperitoneal section in intrapartum infection? Does the need to sterilize a patient ever constitute of itself a justifiable reason for hysterectomy?

Since in Reis and DeCosta's series of 23,124 deliveries, only 25 cesarean hysterectomies were performed because of myomata, or 1 per 1000, it is apparent that they follow a fairly conservative policy. Except in extreme cases, the indication for the operation on the grounds of myomata will depend largely on the number of living children and the patient's desire for future offspring. Most of these uteri can be saved if further childbearing is contemplated and, as a rule, behave surprisingly well in pregnancy and labor even though multiple myomata are present 5 cm. or so in size. But the statement is sometimes made that cesarean hysterectomy will save the patient a future operation. In some hands this indication is certain to lend itself to abuse and even in well-intentioned hands may occasionally rest on a fallacious prophecy. As we all know, myomata tend to increase in size in pregnancy and to diminish thereafter to as much as one-half their dimensions at term; hence it may be hazardous to predict in late pregnancy or at cesarean just how necessary a future operation may become.

Today, as stressed by the above authors as well as by Briscoe (*Am. J. Obst. & Gynec.*, 48, 16, 1944) intrapartum infection is not an especially common cause for cesarean hysterectomy. Given, however, a multipara with two or more living children, an outright intrapartum infection and an indication for abdominal delivery, cesarean section is to me the operation of choice. This statement is based chiefly on the experience of our clinic with some 275 cesarean hysterectomies in more than 100 of which the indication was frank intrapartum infection; only one death from peritonitis has occurred in this series, this despite the fact that the cases date back to 1900. As I see it, the chief and only substantial advantage of extraperitoneal cesarean section over cesarean hysterectomy is that it saves the uterus; and in primigravidae and secundigravidae, of course, this advantage for the future is transcendent. If asked, however, which gives the greater protection

years postoperative. Although every effort was made to avoid leading questions, clear cut evidence of hot flushes, etc. was elicited in 16.6 per cent of the cases. Other such studies carried out on patients following hysterectomy for gynecological conditions (with ovarian conservation), have shown a much higher incidence of menopausal symptoms, 44 to 58.0 per cent. All these cases are due presumably to injury to the ovarian blood supply in the course of hysterectomy (Dippel, A. L., *Am. J. Obst. & Gynec.*, **37**, 111, 1939).

All in all, O'Connor's conclusions seem questionable to me on 2 scores: 1. I do not believe that cesarean hysterectomy is any safer, in repeat elective sections, than section with tubal ligation. 2. Cesarean hysterectomy, despite ovarian conservation, is occasionally followed by a surgical menopause.—Ed.)

cent mortality is a "very important difference, in fact a decisive difference," and stated in part "The doctor must judge as best he can, that in this particular case the radical procedure is twice as safe." (Current Theology, a reprint from Theologic Studies, 5, December, 1944) If one looks at the patient as a whole, as an entity in time, as an individual with a responsibility to a family and husband both now and in the future, it would seem logical to take both the present and future risks into consideration. Those who favor two procedures for sterilization seem rather unconcerned as to the future of these patients, or at least unaware of possible dangers. They perform a procedure that carries at least the same and probably a greater risk than the conservative operation, and which definitely fails to avoid possibility of danger in the future, when a procedure simple to perform and with a lower mortality is at hand—and a procedure which at the same time will eliminate future dangers. They have failed to see the forest for the trees. They have been too interested in ingenious little techniques and have lost sight of a consideration of the safety of the patient as a whole.

In view of all these circumstances the author recommends that cesarean hysterectomy be given much more consideration as an elective procedure at repeat cesarean section and that it should be performed often in the patient over 40 years of age; in the presence of poor scars; when the uterus does not contract perfectly; in the presence of marked adhesions; after the third or more classical section; and in patients who are subject to severe grades of heart disease, kidney disease or tuberculosis. Further experience may reveal it to be the procedure of choice routinely at or after the third section, even of the low type.

(Given a 25 year-old woman who has had 2 previous classical sections and upon whom sterilization is contemplated in association with her third section, which is the preferable operation: cesarean hysterectomy or section followed by tubal ligation? Or, let us say that the patient is 30 or 35?

At all ages in such a case, as I interpret this article, O'Connor would favor cesarean hysterectomy. His chief reason is that he regards it as safer than section and tubal ligation, indeed 3 times as safe, the mortality rates which he estimates for the two operations being 0.5 and 1.5 per cent respectively. I have never been impressed by the fact that repeat cesarean section is any more dangerous than primary section provided both are done electively, but in order to confirm or refute this impression, I have looked up the repeat sections done in this clinic since 1935 in which tubal ligation (mostly Pomeroy) was also performed. There have been 192 such cases, mostly third sections but in one instance the seventh. There was only one maternal death in this series which occurred in 1936; this was in no way attributable to the type of operation performed, but even if it had been the mortality rate for the series is 0.5 per cent, the exact figure which O'Connor estimates for cesarean hysterectomy. Moreover, this figure is approximately the same as that shown by primary section in the clinic, indicating that in our hands at least repeat section carries no more risk than primary.

As O'Connor states quite correctly, the late Dr. Williams used to favor cesarean hysterectomy for sterilization and in the late twenties and early thirties we had a considerable experience with it in the clinic. In 1938 Dippel interrogated 42 of these hysterectomized women (with ovarian conservation) in regard to menopausal symptoms. They had all been under 35 at the time of operation and the interview was carried out from 1.6 to 8.0

- (c) Placenta previa
- (d) Rupture of the uterus
- (e) Infections

Since these 5 conditions play such a large part in maternal mortality all deaths from these causes are subdivided according to whether the delivery was spontaneous or operative.

TABLE 1

*Statistics on maternal deaths at the Bâle Maternity, for the years 1940-1943*

Large "X" indicates single cause of death as specified; small "x" indicates multiple causes. For instance, in this period there were two deaths from infection after cesarean section the indications for operation being toxemia and abruptio. (Koller, Portes, Mayer and Wenner.)

1940-1943 DELIVERIES-9904 DEATHS-9 RATIO-1:1000		DEATHS DUE TO COINCIDENTAL DISEASES		DEATHS DUE TO CHILDBEARING STATE										TOTAL FATALITIES		
				Extragenital Causes					Genital Causes							
				Acute Infections	Chronic Infections	Miscellaneous	Aggravation	Toxemia	Embolus	Miscellaneous	Atony	Hemor- rhage	Lacer- ations		Abruptio	Placenta Previa
In pregnancy																
In Labor	Spontaneous Delivery		X							X						2
	Vaginal Opera- tion												X			1
	Cesarean Sec- tion					X					X					2
In Puerperium	Spontaneous Delivery						X									1
	Vaginal Opera- tion															0
	Cesarean Sec- tion					x					x			X xx	5 - 2 (redu- plication) = 3	
Deaths			1			2	1			1	2		1	3	11 - 2 = 9	
Per cent of De- liveries		0.01			0.02	0.01			0.01	0.02		0.01	0.03			

Type of Delivery	Cases	Deaths	Per cent
Spontaneous deliveries.....	8734	3	0.03
Operative deliveries, vaginal.....	976	1	0.1
Operative deliveries, cesarean section.....	194	5	2.6
Total deliveries.....	9904	9	0.1

## SOCIAL AND LEGAL ASPECTS

### PROJECT FOR STANDARDIZATION OF INTERNATIONAL STATISTICS ON MATERNAL AND INFANT MORTALITY

MM. KOLLER (*Bâle*), PORTES (*Paris*), MAYER (*Paris*)  
AND WENNER (*Bâle*)

Gynécologie et Obstétrique, 45, 756-773, 1946

The paper has as its ultimate objective the establishment of a uniform basis for comparing obstetrical reports from different clinics and especially from different countries. As a beginning it seemed logical to present a classification of the causes of maternal and fetal mortality.

#### I. *Maternal mortality*

##### 1. *Classification according to Time of Death.*

- A. Death during pregnancy. (As will be discussed in an editorial note appended, this system of classification includes only deaths occurring after the 28th week.)
- B. Death during labor or within the first 24 hours thereafter, the intention being to include in this category all fatalities which are the immediate and direct result of labor and delivery. Thus, deaths from shock and postpartum hemorrhage would appear here although exitus might not have occurred until 12 to 15 hours after delivery.
- C. Death in the puerperium from the 24th hour postpartum until discharge from the clinic.

##### 2. *Classification according to Cause of Death.*

- A. Conditions which are neither due to, nor are definitely aggravated by, the childbearing state, (i.e. coincidental conditions).
  - (a) Acute diseases such as appendicitis, pneumonia, etc.
  - (b) Chronic diseases not definitely aggravated by pregnancy such as carcinoma, leukemia, pernicious anemia, tuberculosis, etc.
  - (c) Miscellaneous, such as accidental trauma, etc.
- B. Extragenital conditions which are either due to or are definitely aggravated by the childbearing state.
  - (a) Heart disease, pyelitis and nephritis, for example.
  - (b) Eclampsia and pre-eclampsia
  - (c) Thrombosis, embolism
  - (d) Miscellaneous
- C. Genital conditions
  - (a) Postpartum hemorrhage
  - (b) Abruptio placentae



TABLE 2

*Statistics on stillbirths and neonatal deaths at the Bâle Maternity, 1924 to 1935*

The classification of the causes of death is that given in the accompanying abstract. The figure in the upper left hand corner of the square indicates fetal death in pregnancy; in the center of the square, fetal death in association with labor; that in the lower right hand corner, a neonatal death. The gross figure (bottom line) for 1944 was 1.9 per cent. (Koller, Portes, Mayer and Wenner.)

	1924	1925	1926	1927	1928	1929	1930	1931	1932	1933	1934	1935
Malformations congénitales	1 2 1	2 2 3	5	1 4 2	4 1 4	1 8 3	3 2	3 3 4	4 4	2 3 3	1 4	4
Causes placentaires												
anomalies placentaires	2 3	1 4 5	4 5	1 5	3 5	3	2	2 1	2	1 2	3 1	
providence du cordon	1	3	3	5	4	4	3		2	5	6	1
décollement prématuré	2		1	1	1	1	3 1	2	4	2		1
placenta praevia	4	2	1			2	3	4		1		2
Maladies maternelles												
infections aiguës		3 1	5		1		1 5	3	5	5	1	
néphropathies	1	2	4	4 1	6 2	5	5 3	4	4 1	2 2	4	5
éclampsie	2	1 1	1 1	1 4	1	1		1 2	2			1
mort intra-utérine												
enfants prématurés		5	12	6	7	1	6	5	13	9	8	2
à terme	7	4	5	1	5	3	1	2	2	2	3	4
grossesses prolongées	3	5	4		5	3	5		5	2		3
Atteintes en rapport avec l'accouchement - même												
asphyxie	6	6	8	7 1	6	3 1	9	4 1	4 1	1	1 1	7
présentations du siège	6	2	4	3	5	4	5	8	4	4	3	1
position transverse	1	2	5	3	1	1	1	2	5	3	3	2
traumatismes	1	2 2	2 1	2 1	1 1	2 1	2 1	2 2	2 2	2 2	2 2	2 2
causes variées	1		3	2 1	1	3	1	3	5 1	3	3	2 2
Maladies de l'enfant												
enfants débiles (adynamie)	17	8	14	9	8	12	18	17	14	13	7	15
melaena du nouveau-né	1			4	1			1				
ictère grave		1	2	1	2						2	1
infection		2	1					2	1	1		
luës congénitale	2						1			3	1	
affection aiguë	3	5	4	9	10	2		11	4	3	1	4
causes variées			1								1	
Total durant la grossesse	16	22	35	18	29	16	19	25	36	28	23	18
" " l'accouchement	26	22	33	36	29	33	33	27	26	26	21	20
" après l'accouchement	25	21	28	28	26	18	22	38	27	23	19	28
Nombre des cas mortels	67	65	96	82	84	67	74	90	89	77	63	66
" accouchements	1632	1,648	1,719	1,797	1,923	1,906	1,937	2,000	2,016	1,919	2,050	2,128
cas mortels % d'accouchement	4.1%	3.9%	5.6%	4.6%	4.3%	3.5%	3.8%	4.5%	4.4%	4.0%	3.1%	3.1%

### 3. Debatable Cases. (Cas litigieux)

Certain cases call for classification under two or more categories. For instance, if a case of placenta previa is treated by cesarean section and dies later of infection, the case should be listed both under placenta previa and under infection. In order to meet this situation the authors employ the following artifice: in "chalking up" a death against a given cause, a small "x" rather than the usual capital "X" is used to indicate that the causes of death were multiple.

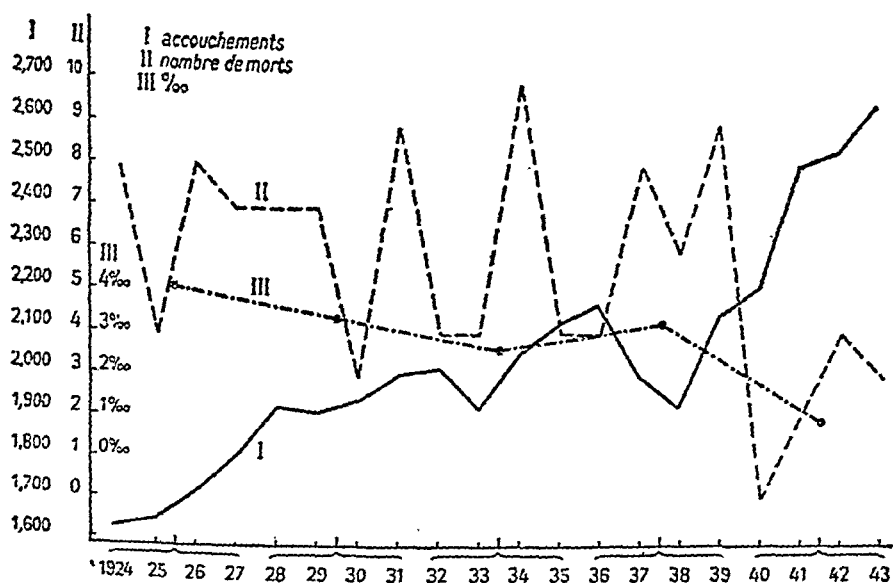


FIG. 3. Statistics of the Bâle Maternity, showing (I) number of deliveries per year; (II) number of maternal deaths; and (III) maternal mortality rates per thousand deliveries. (Koller, Portes, Mayer and Wenner.)

### II. Infant (fetal and neonatal) mortality

Here again a division is made according to the time of death, as follows:

- A. Death during pregnancy
- B. Death during labor
- C. Death after delivery

Any infant who cries at birth and died subsequently is classified under "C." However, any infant whose heart is beating at birth but does not breathe and dies (heart stops) within 2 hours after birth is classified as having died in labor.

The causes of infant death are classified under 5 main groups, as follows:

1. Malformations
2. Placental causes
  - (a) Abnormalities of placental tissue or cord
  - (b) Prolapse of cord
  - (c) Abruptio placentae
  - (d) Placenta previa

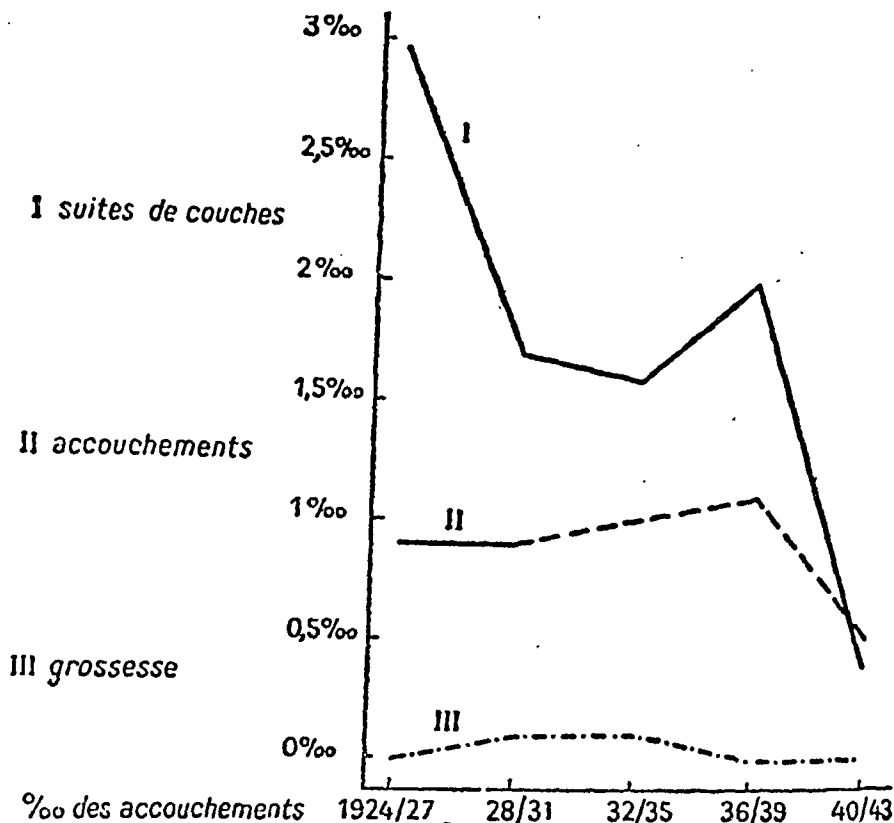


FIG. 5. Statistics of the Bâle Maternity, in successive 4 year periods, showing maternal deaths per 1000 deliveries, divided according to whether the death occurred (I) in the puerperium; (II) in association with labor; or (III) during pregnancy. (Koller, Portes, Mayer and Wenner.)



FIG. 6. Statistics of the Bâle Maternity, showing (I) number of deliveries per year; (II) number of infant deaths, stillbirth and neonatal; and (III) infant death rates per 100 deliveries. (Koller, Portes, Mayer and Wenner.)

## 3. Maternal diseases et cetera

(a) Acute diseases of mother

(b) Nephropathy

(c) Eclampsia

(d) Intrauterine death: 1. Premature infant. 2. Infant at term. 3. Infant after term

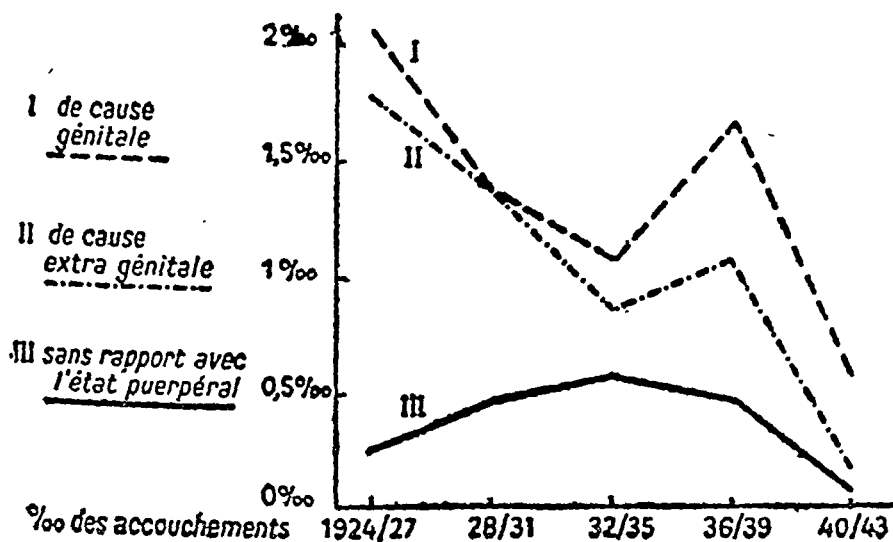


FIG. 4. Statistics of the Bâle Maternity, in successive 4 year periods showing maternal death rates per 1000 deliveries, divided according to classification given in abstract. (Koller, Portes, Mayer and Wenner.)

## 4. Obstetric trauma

(a) Asphyxia

(b) Melena

(c) Icterus gravis

(d) Acute infections

(e) Congenital syphilis

(f) Miscellaneous

As an example of how the above classifications lend themselves to practical and graphic presentation, the statistics of the Bâle Clinic are reported by Koller and Wenner in a series of tables and graphs. By plotting the causes of death against the time of death and type of delivery, tables are shown which make it easy to see at a glance the pertinent facts about both the maternal and fetal deaths.

(Many obstetrical and gynecological clinics in this country issue annual statistical reports showing their clinical results and these are always informative and valuable. However, if an attempt is made to compare the data from one clinic with that of another, it is usually difficult if not impossible to do so because of the different ways in which the facts

birth increases. The fall in the rate of stillbirths has been greatest in the youngest age-group and progressively smaller as the age of the mother increases. For mothers under 20 years, the rate fell by 29 per cent from 1927-30 to 1940-43, and for mothers 20-24 years, by 21 per cent. For mothers 40-44 years, the fall of the rate was only 9 per cent, and for mothers 45 years and over, it was only 7 per cent.

The rate of stillbirth for first children is about 15 per cent higher than the general rate; however, this rate has also fallen the most. The rate for second children is lowest, about 25 per cent below the general rate. The rate then increases sharply with the order of birth of the child. For sixteenth children and over, it is 3 times as high as the rate for second children. The fall in the rates has been greatest in the lower orders of birth. For the higher orders—tenth birth and over—the rate has actually increased. The middle orders of birth are mainly concentrated in the age-groups 25-39 years, and the higher orders are mainly concentrated in the age groups 35 years and over. The smaller proportionate fall in the rates for the middle orders and the actual increase in the rates for the higher orders explain why the fall in the rates for the different age-groups has been proportionately less as the age of the mother increases.

The results of this study make it clear that the factors of sex, legitimacy, age of the mother and order of birth of the child must be taken into account in a study of the medical causes of stillbirths on the one hand, and of social conditions involved on the other.

and figures are arranged. If these divergencies exist in reports issued within one nation, it is understandable that reports from various countries would be even more troublesome to compare. The above article by a group of French and Swiss obstetricians is a commendable attempt to meet this difficulty and might well start us all to thinking about the desirability of more uniformity in reporting results. If this could eventually be worked out so that clinics in the United States as well as through the world reported their data according to the same classification, it would be a step forward in world obstetrics of the first order.

Owing to special circumstances in the clinic at Bâle, complications of pregnancy prior to the 28th week, I understand, are not handled in the maternity division and therefore deaths in that category are not included in the above report. This would seem to be a serious omission since fatalities from abortion, ectopic pregnancies, chorionepithelioma, etc., are excluded thereby from consideration. There are possibly other errors of omission or commission, but this classification, I take it, is to be regarded as merely a preliminary proposal subject to amendment. As such, it bespeaks an end much to be desired and it is hoped that the project will elicit active interest everywhere.—Ed.)

## RATES OF STILLBIRTHS IN CANADA

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Canad. J. Pub. Health, 38: 168-181, 1947

Stillbirths in Canada at present constitute about 2.5 per cent of the total number of births, and about 30 per cent of the total loss of life under one year of age. The former percentage is decreasing; the latter is increasing.

The rate of stillbirths has been falling slowly, but less than the rates of infant mortality. From 1927-30 to 1940-43, the rate of stillbirths fell by 18 per cent, the rate of infant mortality under one week fell by 30 per cent, the rate from one week to one month by 40 per cent, and the rate from one to 12 months by 46 per cent. The longer the period of life during the first 2 years, the greater the proportionate fall in the rate of infant mortality.

In 1940-43, the rate of male stillbirths was 18 per cent higher than the rate of female stillbirths. The rate of male stillbirths has been falling faster than the female rate; in 1927-30, the male rate was 28 per cent higher than the female rate.

In 1927-30, the rate of illegitimate stillbirths was 56 per cent higher than the legitimate rate; in 1940-43, it was 27 per cent higher. Allowing for the different distribution by age of the mother of illegitimate births, the illegitimate rate was 83 per cent higher in 1927-30 and 38 per cent higher in 1940-43. The social barriers to the proper prenatal and natal care of illegitimate children have been breaking down.

For mothers under 25 years, the rate of stillbirth is lowest, and it increases sharply with age. For mothers 45 years and over, it is 3 times as high as for mothers under 25 years. The influence of age of the mother is most marked in the case of first children; it becomes considerably less marked as the order of

forceps maneuver described by Bill. If these cases were placed in the mid-forceps group, it would increase the incidence of midforceps. However, they are not included, as they might well be placed in the low forceps group by those who do manual rotations and allow their patients to go further and await the forces of labor to bring about descent of the head.

The writer's incidence of cesarean section was very low, 1.3 per cent. Newburger's report gave an incidence of 3.1 per cent. Falls states that some hospitals run as high as 14 per cent. The low figure in the present study reveals conservative obstetrics, but not too conservative in view of the mortality rates in both infants and mothers.

Toxemia was seldom encountered in the present series; when present it was usually mild, and the author does not believe that there were over 3 or 4 cases that could be placed in the pre-eclampsia group. There were no cases of eclampsia.

Only 3 cases of postpartum hemorrhage were listed. Newburger reports 1.3 per cent. Packing was not used except as a last resort. There was no mortality in the group of postpartum hemorrhages.

There were a number of patients who revealed some evidence of postpartum infections. Nearly every case was mild and was rather easily controlled by sulfonamides and penicillin when indicated. Here again there was no mortality. Newburger reports 3.2 per cent infections.

Fetal abnormalities were encountered more often than is commonly noted. There were 6 infants born with spina bifida; 2 of these had associated hydrocephalus. There was one each of the following: Mongolian idiot, congenital heart and bilaterally clubbed feet. This gave an incidence of nearly 2 per cent. The number of spina bifida infants was completely out of place with other studies, where it rates fifth among deformities. Why the number of fetal abnormalities should be so high is only a matter of conjecture. Titus states that he is entirely convinced that there is a possible development of a monstrosity when a healthy ovum is fertilized by an abnormal or deformed spermatozoon. This leaves the question whether military life is a contributing factor in giving rise to defective sperm and ovum and in turn a larger incidence of monstrosities.

There was no maternal mortality. Newburger, reporting for a similar number of patients, found the maternal mortality to be 6 per 1,000 cases.

The stillbirth rate was very low; one from a prolapsed cord in breech presentation, one from placenta abruptio, one of unknown cause and 2 due to hydrocephalus. The incidence in the Cook County records was 46 stillbirths per 1,000, or 22.7 per cent. There were only one or 2 neonatal losses compared with 35 per 1,000 in Cook County.

## MISCELLANEOUS

### A GENERAL SURVEY OF MATERNAL CARE IN A NAVY HOSPITAL

G. G. GREENE

*From the Family Hospital, a Unit of the U. S. Naval Hospital,  
Lexington, Kentucky*

Am. J. Obst. & Gynec., 53: 669-673, 1947

In this report, the author attempts to compare the status of maternal care rendered by Navy physicians during and shortly after the recent military emergency with that rendered in civilian life. The present study deals with an estimated 1,500 to 2,000 prenatal cases and approximately 500 deliveries for the stated period. Newburger has made a comprehensive study of all obstetric activities in Cook County during 1944. There were 5 hospitals in the group which had 350 to 499 deliveries per year, and it is with this group that the author's results are compared.

Prenatal care in the writer's clinic was similar to that of any well-organized clinic. Patients were observed closely for any toxemic symptoms, treated immediately and observed frequently when such symptoms were noted. Weight was watched closely, a gain of 20 pounds or less for the entire pregnancy being accentuated and demanded. The author believes that this was a factor in the large percentage of short labors observed in most primiparous women where many 3- to 10-hour labors were seen. Usually the babies weighed between 6 and 8 pounds.

For analgesia the usual routine was to give 100 mg. of demerol and  $\frac{1}{10}$  grains of hyoscine as soon as the patient became rather uncomfortable. Doses of both drugs were used together or separately as often as seemed necessary thereafter. A very desirable state of amnesia and analgesia was produced and only on rare occasions did the necessity of resuscitation arise. The mothers did not appear to have prolonged narcosis after delivery.

Nearly all patients received drip ether for anesthesia during delivery, the chief reason for this type of anesthesia being a lack of available anesthetists.

Less than one-third of the patients delivered spontaneously. In a similar group of civilian hospitals, Newburger reported 78.8 per cent delivered by this method. The author believes that the most plausible reason for this difference is that in his group so many women were giving birth to their first child. It is his opinion that low forceps and episiotomy is a method of choice.

The percentage of midforceps was well over 3 per cent, while Newburger's figures show only 1.2 per cent. This is not considered as radical obstetrics when it is seen that no stillbirths resulted in this group. A number of cases which presented posterior positions of the fetal head were delivered by the



allow vaginal delivery, preparations for blood transfusion should be made well in advance and any untoward symptoms regarded with suspicion of uterine rupture. Careful palpation of the scar for tenderness at frequent intervals should be performed, and at the first indication of any intra-abdominal disturbance immediate laparotomy carried out.

In this particular case the committee felt that the patient would have been more safely handled by elective cesarean section two to three weeks from term, but in addition to this voted the death a preventable one because of the physician's lack of awareness of the danger of rupture of the old scar. When the scar did rupture he was unprepared for the catastrophe.

#### CASE NO. 48

The patient was a 31 year old white para 3 with 3 living children, whose EDC was March 10. In the patient's first pregnancy she developed hypertension, albuminuria, and edema, followed by convulsions during labor. The second and third pregnancies and deliveries were stated to have been normal and uneventful, but following this the patient was advised against further pregnancies. In the current pregnancy the patient first consulted her physician when she was approximately 3 months pregnant. She made a total of only three prenatal visits, the last one being three months prior to delivery. At this last prenatal visit, blood pressure, urine and weight gain were within normal limits.

The patient did not make any further office visits and called her physician when she fell into labor on March 4. After a very short labor she was delivered spontaneously of a living child. The patient had no complaints following delivery, and the physician left the home without having taken the blood pressure either during labor or following delivery. One hour later he received a call from a neighbor stating that the patient was "unconscious". He returned to the home at once and found the patient in good condition and fully conscious, but shortly after his arrival the patient had a generalized convulsion and lapsed into coma. She was transferred immediately to a nearby hospital. Upon admission the patient was in coma, and the blood pressure was found to be 180/110. She was given paraldehyde by rectum, 50% glucose intravenously, and 50% magnesium sulphate intravenously. This therapy was repeated three hours later, but the patient died approximately four hours after her admission to the hospital without having regained consciousness. Death occurred 11 hours postpartum.

*Comment:* The determination of blood pressure during pregnancy, labor, and the puerperium, has long been accepted as one of the basic essentials of adequate care of the pregnant or recently pregnant woman. Regular and frequent prenatal visits, particularly during the last two months of pregnancy, have likewise been proven essential to intelligent care. In this instance the patient's death is readily attributable to the neglect of these two fundamental aspects of adequate care. The committee felt this was a preventable death and was of the opinion that the patient's obvious lack of cooperation did not excuse the physician. With a history of previous eclampsia careful attention to the blood pressure during labor and immediately following delivery was urgently indicated. In fact, even in the absence of such a previous history, failure to check the blood pressure is inexcusable. Eclampsia is much more easily prevented than cured.

#### CASE NO. 49

The patient was a 23 year old white primigravida due by dates on July 10. She had received prenatal care beginning at approximately the 26th week and made a total of 3 prenatal visits, at which times all findings were within normal limits. She fell into labor

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# Maternal Mortality Reports

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*(Secretaries of Maternal Mortality Committees are invited to submit selected cases of maternal deaths, with analyses appended, for publication in this section of the Survey. Cases should be chosen on the basis of educational value, not because of rarity. For obvious reasons complete anonymity will be maintained.*

*Readers should note that the comment which follows each case history represents the opinion of the Committee concerned and does not necessarily reflect the attitude of the Editors.)*

## CASE NO. 47

The patient was a 24 year old white para 1 with 1 living child, whose EDC was May 22. In the patient's previous pregnancy she was delivered by classical cesarean section because of abdominal pain and vaginal bleeding. The first few days after delivery are described as being "stormy". The patient consulted the same physician who had cared for her in the previous pregnancy at about the 20th week. At this time the blood pressure was slightly elevated, and the urine contained a trace of albumin. She was given dietary instructions and told to restrict her activities, and when seen two weeks later the blood pressure was normal and the urine free of albumin. She remained on a rigid diet, and the blood pressure and urine remained normal for the remainder of her pregnancy.

The patient was admitted to the hospital for observation not in labor two days before her EDC, namely May 20. On the afternoon of May 22, the patient complained of a few abdominal pains and was seen by her physician at 4:00 p.m., and again at 7:00 p.m., and at neither time were any abnormalities noted. The attending physician phoned the hospital at 9:00 p.m. on May 22 and was told the patient was having a few mild abdominal pains. He visited the hospital at 1:00 a.m. on May 23 and found the patient in profound shock, pulseless, and with marked air hunger. She was still conscious, however, and stated that she had begun to feel weak and dizzy approximately an hour earlier. She was immediately begun on plasma, and was grouped and matched for transfusion. Blood was started, but before anything further could be carried out the patient died in shock at 4:00 a.m., May 23.

*Comment:* The death certificate on this patient gives the cause of death as premature separation of the placenta, but it was the feeling of the committee that this was almost unquestionably a case of rupture of the uterus following previous cesarean section. The problem of dealing with patients with previous cesarean section is a difficult one and requires careful evaluation of many factors. Among these factors the type of post-operative course following the previous section must be considered, and in this particular case the physician had full knowledge that the previous puerperium had been a stormy one, thus pointing to the probability of a poor uterine scar. In deciding to allow such patients to proceed to term with the expectation of vaginal delivery, it is imperative that the risk of rupture of the uterine scar be constantly borne in mind. The size of the bony pelvis should be determined by x-ray pelvimetry, the location of the placental attachment determined by x-ray, and the size of the infant in regard to over-distension of the uterus carefully considered.

When all factors have been carefully weighed and a decision reached to

allow vaginal delivery, preparations for blood transfusion should be made well in advance and any untoward symptoms regarded with suspicion of uterine rupture. Careful palpation of the scar for tenderness at frequent intervals should be performed, and at the first indication of any intra-abdominal disturbance immediate laparotomy carried out.

In this particular case the committee felt that the patient would have been more safely handled by elective cesarean section two to three weeks from term, but in addition to this voted the death a preventable one because of the physician's lack of awareness of the danger of rupture of the old scar. When the scar did rupture he was unprepared for the catastrophe.

#### CASE NO. 48

The patient was a 31 year old white para 3 with 3 living children, whose EDC was March 10. In the patient's first pregnancy she developed hypertension, albuminuria, and edema, followed by convulsions during labor. The second and third pregnancies and deliveries were stated to have been normal and uneventful, but following this the patient was advised against further pregnancies. In the current pregnancy the patient first consulted her physician when she was approximately 3 months pregnant. She made a total of only three prenatal visits, the last one being three months prior to delivery. At this last prenatal visit, blood pressure, urine and weight gain were within normal limits.

The patient did not make any further office visits and called her physician when she fell into labor on March 4. After a very short labor she was delivered spontaneously of a living child. The patient had no complaints following delivery, and the physician left the home without having taken the blood pressure either during labor or following delivery. One hour later he received a call from a neighbor stating that the patient was "unconscious". He returned to the home at once and found the patient in good condition and fully conscious, but shortly after his arrival the patient had a generalized convulsion and lapsed into coma. She was transferred immediately to a nearby hospital. Upon admission the patient was in coma, and the blood pressure was found to be 180/110. She was given paraldehyde by rectum, 50% glucose intravenously, and 50% magnesium sulphate intravenously. This therapy was repeated three hours later, but the patient died approximately four hours after her admission to the hospital without having regained consciousness. Death occurred 11 hours postpartum.

*Comment:* The determination of blood pressure during pregnancy, labor, and the puerperium, has long been accepted as one of the basic essentials of adequate care of the pregnant or recently pregnant woman. Regular and frequent prenatal visits, particularly during the last two months of pregnancy, have likewise been proven essential to intelligent care. In this instance the patient's death is readily attributable to the neglect of these two fundamental aspects of adequate care. The committee felt this was a preventable death and was of the opinion that the patient's obvious lack of cooperation did not excuse the physician. With a history of previous eclampsia careful attention to the blood pressure during labor and immediately following delivery was urgently indicated. In fact, even in the absence of such a previous history, failure to check the blood pressure is inexcusable. Eclampsia is much more easily prevented than cured.

#### CASE NO. 49

The patient was a 23 year old white primigravida due by dates on July 10. She had received prenatal care beginning at approximately the 26th week and made a total of 3 prenatal visits, at which times all findings were within normal limits. She fell into labor

spontaneously on July 5 and when seen at 7:00 p.m. was in early labor. The blood pressure was normal, the urine negative for albumin, and heart and lungs were normal. Labor progressed normally and uneventfully and at 9:30 a.m., July 6, she was delivered spontaneously under light nitrous oxide anesthesia of a living male infant. The placenta separated spontaneously and was expressed intact soon after delivery of the child. 1 cc. of ergotrate and  $\frac{1}{2}$  cc. of pituitrin were given intramuscularly immediately following delivery of the placenta. She continued however, to have more than the usual vaginal bleeding, and accordingly a vaginal pack was inserted. The pack was removed 1 hour later and shortly thereafter the patient went into profound shock. She was given intravenous saline and glucose but died 3 hours and 20 minutes after delivery.

*Comment:* Nearly all maternal mortality studies at the present time indicate that hemorrhage has become the principal cause of maternal death. The course this patient followed is fairly typical of those succumbing of postpartum hemorrhage, namely, continued steady vaginal bleeding which is not controlled. Prevention of deaths such as this involves two primary considerations. First, the bleeding must be controlled by one means or another, and secondly, blood loss must be replaced by blood. Many pertinent details in the handling of this patient are not known, such as the consistency of the fundus while the patient was bleeding, whether or not sterile vaginal examination was done to determine the presence or absence of cervical lacerations, and what other attempts were made to control the bleeding other than packing the vagina. The insertion of a vaginal pack in postpartum hemorrhage is not only useless, but dangerous, since it merely conceals the amount of bleeding which is taking place. The committee voted this death preventable on the basis of improper treatment and lack of blood transfusion.

#### CASE NO. 50

The patient was a 27 year old white para 1 with one living child who was due by dates on March 10. Her previous pregnancy had been complicated by a severe postpartum hemorrhage which, however, had been controlled, and the patient had made an uneventful recovery. During her present pregnancy she obtained regular prenatal care beginning at the second month and consisting of visits to her physician every three weeks. No abnormalities of any sort were noted at any time. The attending physician makes the statement that "this was one of the most normal pregnancies I have ever attended".

Labor began spontaneously on March 6, four days before her EDC and was uneventful and short. She received no analgesia until the last half hour, when she was given intermittent nitrous oxide with her pains. She delivered spontaneously a normal living infant. Following delivery of the child there was considerable difficulty with the placenta. The latter failed to separate for a considerable time, but was eventually expressed with some difficulty approximately 30 minutes after delivery of the child. No notation is made concerning the estimated or measured blood loss during this time. After the placenta had been expressed the uterus still did not contract well, but with vigorous massage was finally brought to a state of moderately firm contraction. The physician at this point left the patient in charge of a nurse and went to another part of the hospital for approximately half an hour. At the end of that time he returned to the delivery room and found that the patient had lost a large amount of blood during his absence and that the pulse was very weak and thready. The patient was anesthetized and redraped, and an intrauterine pack inserted. Coincident with this procedure, 1,000 cc. of glucose was begun intravenously, and later followed by 500 cc. of plasma and 500 cc. of whole blood. In spite of these measures the patient did not respond, remained in profound shock, and died 3 hours and 53 minutes after delivery. Apparently there was no further external bleeding after the uterus had been packed.

*Comment:* While it is true that one postpartum hemorrhage does not necessarily mean postpartum hemorrhage will occur in subsequent pregnancies, nevertheless, there is a definite tendency for patients to have repeated postpartum hemorrhages. Patients with previous difficulties of this nature should be grouped and matched prior to delivery and should be watched with unusual care during and after the third stage. Such care should include most careful observation of the postpartum uterus by an experienced person. So often the difficulties of this type which arise are due to the fact that the patient is left with an inexperienced nurse who does not understand the principles of proper management of the postpartum uterus. The committee voted this a clearly preventable death for the following reasons:

1. Difficulty should have been anticipated and prepared for because of the patient's previous history.
2. Oxytocic drugs should have been used in addition to massage of the uterus to combat the atony of the uterus. When this failed to control the bleeding immediate exploration of the birth canal was indicated to rule out remaining placental tissue, lacerations of the cervix, or the possibility of a partial inversion of the uterus.
3. Lastly, the physician left this patient before all chance of serious bleeding had passed, and it can only be assumed that he left her in charge of a nurse who did not understand the significance of continued vaginal bleeding.

#### CASE NO. 51

The patient was a 35 year old multipara due by dates on July 26. Her past history is of importance in that approximately fifteen months prior to delivery she underwent conization of the cervix. Unfortunately the details concerning the manner in which this procedure was carried out are lacking. The current pregnancy progressed entirely normally and uneventfully, and the patient fell into spontaneous labor six days before her expected date of confinement. Labor progressed rapidly, and the patient was delivered spontaneously of a living child. Immediately following delivery of the infant there was profuse hemorrhage. Sterile vaginal examination was immediately performed and revealed seven or eight longitudinal cervical lacerations about 3 to 4 inches in length extending up into the lower uterine segment. The uterus and vagina were packed, and the patient was given 1,000 cc. of plasma, and 1,000 cc. of citrated blood while preparations were being made for hysterectomy. In spite of these measures the patient continued to bleed profusely and died 2½ hours after delivery before hysterectomy could be performed.

*Comment:* In this case the committee was unable to arrive at any conclusion concerning the preventability of this death. The case history is presented as a matter of general interest to illustrate the possible end results of extensive conization of the cervix. In the absence of any detailed information concerning the manner in which the conization was performed, it could only be assumed that a very extensive procedure was carried out resulting in considerable scar tissue. When the patient went into labor, the force of the uterine contractions apparently split the scar tissue, instead of dilating the cervical orifice.

From the above it would seem advisable to proceed with caution when carrying out conization of the cervix on patients in the childbearing age.

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# Gynecology

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## ENDOCRINOLOGY

### THE IMPORTANCE OF THE LIVER IN REPRODUCTIVE PHYSIOLOGY

S. J. GLASS

*Los Angeles, California*

West. J. Surg., 55: 114-119, 1947

Since Zondek, in 1934, postulated that the liver inactivates estrogens, numerous substantiating observations have followed. For instance, Talbot induced liver damage by feeding carbon tetrachloride in alcohol to female rats and found that the uterine weights increased almost 200 per cent by the third day. A control group was spayed, then fed the same toxic mixture. In none of these were the uteri heavier than in the normal untreated rats. Talbot concluded that the uteri of the poisoned animals were exposed to an increased blood concentration of estrogen, and since the uteri of the castrate animals did not increase, that the ovaries were the only source of estrogens to cause an increase in uterine weight in the poisoned animals.

Biskind has shown that nutritional deficiency of even moderate degree will impair hepatic inactivation of the gonadal hormones, in the absence of detectable gross or histological lesions in the liver. Similar deficient diets fed to male rats failed to influence the inactivation of androgens. However, subsequent work showed that androgen inactivation does take place, but at a much slower rate.

Testicular damage can be induced in man and laboratory animals by the administration of estrogens. These effects are intensified by the coexistence of hepatic insufficiency. Feiner, Krichesky and Glass observed spontaneous testicular damage in male rats with experimental cirrhosis. Only mild impairment of spermatogenesis occurred in rats fed smaller amounts of carbon tetrachloride or if the experiments were of short duration.

Clinically, Glass, Edmondson and Soll found a relatively new syndrome of gynecomastia and testicular atrophy associated with cirrhosis of the liver. In their study of this male group of cirrhotics, it was possible to demonstrate urinary free estrogens. These observations imply that cirrhosis of the liver can induce striking testicular atrophy with inevitable impotence and sterility, and that the most likely agent responsible is circulating biologically-free active estrogen, a result of failure of estrogen inactivation. The major testicular damage results

from chronic liver disease and gynecomastia is seen only when hepatic decompensation is of long standing.

The writer concludes that the same mechanism disturbs reproductive physiology in both men and women. In the presence of chronic liver damage, free estrogens are constantly available to evoke pathologic effects in the sex organs. Such estrogens suppress gonadal function by direct effect on the germinal epithelium, but more especially by interference with the function of the pituitary-gonadal axis. Impairment of spermatogenesis and ovulation is an inevitable sequel of the long continued presence of excessive amounts of steroid hormones.

(While there is general acceptance of the belief that the liver plays the most important part in the inactivation of estrogen, we cannot as yet be sure, especially in view of quantitative uncertainties, as to the bearing of this on the production of such disorders as uterine bleeding, nor is there as yet any sharp crystallization as to the value of the vitamin B therapy urged by Biskind on the basis of the above premise. The syndrome of gynecomastia with testicular atrophy in association with cirrhosis of the liver would seem to support the concept that liver damage, by interfering with estrogen inactivation, may actually produce striking hormonal syndromes. But it is too early to form definite ideas on this subject.—Ed.)

## DISORDERS OF SEX AS A MANIFESTATION OF ENDOCRINE ABNORMALITIES

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*Guy's Hospital and the Chelsea Hospital for Women*

Practitioner, 158: 295-306, 1947

The writer discusses the disorders of sex that are a manifestation of endocrine abnormalities during the 5 stages of life: prenatal, prepubertal, adolescent, mature and climacteric.

Sex determination and sex differentiation are discussed, and it is stated that if chromosomal influences can determine the sex of the gonad they should be capable of differentiating the rest of the reproductive tract. On the other hand, it might be reasonable to suppose that the gonad, once formed, should by its endocrine secretions control further development of the reproductive tract. Lillie first demonstrated an endocrine influence in sex differentiation. In the uterus of the cow in which the placentas of twin embryos of opposite sex are fused so that the blood supply is common to both, the gonad of the female embryo becomes a sterile testis and the Wolffian ducts develop at the expense of the Müllerian ducts. It would seem therefore that the secretions of the male twin have profoundly influenced the development of the gonad and reproductive tract of the genetically female twin. Since Lillie's observations in 1917, evidence has accumulated which clearly shows that extraneous endocrine influences can pro-

foundly change the course of sex differentiation. This is no proof that the intrinsic secretion of the embryo's own gonads normally directs this course. Carl Moore (1944) concluded from his studies that, although intrinsic endocrine influences may affect sex differentiation, the normal embryonic gonad has no such function.

This throws some light on male and female pseudohermaphroditism, the principal features of which are summarized in this paper. In male pseudohermaphroditism there is failure of complete sex differentiation, sometimes with persistence of Müllerian duct elements and of female uro-genital sinus derivatives. It has been suggested that these abnormalities may be due to failure of androgenic secretion of the embryonic testis, or to excessive secretion of maternal estrogens at some stage of embryonic life. Moore's findings make the first theory difficult to accept, although the second would be conceivable. In female pseudohermaphroditism the ovaries are poorly developed and the remainder of the reproductive tract is infantile. There is seldom any marked persistence of the Wolffian duct. Hyperplasia of the adrenal cortex has been found in many cases and it has been suggested that the condition may be due to excessive secretion of fetal cortical androgens.

The undescended testicle may be of endocrine origin. The so-called "luteinizing" gonadotrophic hormone of the pituitary influences the descent of the testicle, and administration of a pregnancy urine extract may induce descent of the testicle when it has failed solely through lack of gonadotrophic stimulus. The canalicular undescended testicle responds to endocrine therapy in about 50 per cent of cases.

Disorders of sex during the prepubertal stage lead to precocious puberty. The possible causes are: endocrine tumors of the gonads, adrenal cortical tumors, pineal tumors and tumors in the region of the hypothalamus. Granulosa cell tumor of the ovary occurs before puberty in about 10 per cent of cases. At that time it gives rise to breast development, enlargement of the labia and clitoris, growth of pubic hair and irregular uterine bleeding. The treatment is surgical, following which all signs of precocity rapidly disappear.

Before puberty the adrenal cortical tumor is often malignant and occurs more often in girls than in boys. Male secondary sex characteristics predominate in both sexes. There is hirsutism, and signs suggestive of Cushing's syndrome are not uncommon.

In the adolescent stage, ovarian deficiency may be apparent in its mildest form, "menstrual instability" or as primary amenorrhea. In the mild form the menarche is late, is followed by amenorrhea and then an oligomenorrheic pattern leading to an early menopause. There is often mild hirsutism and acne. "Primary amenorrhea" should not be diagnosed until after the age of 18. It may be secondary to pituitary deficiency or it may be due to primary ovarian failure. Statural and sexual infantilism occur, pubic and axillary hair is scanty, the breasts are underdeveloped and the epiphyses ununited. Excess of the "follicle-stimulating" gonadotrophic hormone in the urine distinguishes the condition from primary amenorrhea due to pituitary failure.



In adult life disorders of sex are confined to heterosexual manifestations and functional deficiencies. Defective spermatogenesis and impotence may be present in the male. In the female, adult ovarian deficiency is usually associated with menstrual disturbances and failure to ovulate.

The heterosexual disorders of adult life are exemplified by gynecomastia and virilism. Gynecomastia in association with endocrine tumors is exceedingly rare. The cause of the breast development is still in doubt, and there is no effective endocrine treatment for it. Virilism is manifested by hirsutism, male alopecia, amenorrhea, acne, atrophy of the breasts, deepening of the voice and enlargement of the clitoris. The most valuable aid to diagnosis is the estimation of the 17-ketosteroid content of the urine. Figures up to 40 mgm. a day (about 3 times normal) are commonly found. Endocrine therapy is ineffective in cases of hirsutism. Surgery is indicated if there is a tumor of the adrenal cortex. Rarely, virilism is produced by an arrhenoblastoma of the ovary.

Sex disorders at the climacteric are practically confined to women and give rise to post-menopausal bleeding. The only endocrine cause of this bleeding is excessive estrogen secretion from a granulosa or theca cell tumor of the ovary. Probably the most common cause of post-menopausal bleeding in recent years is therapeutic overdosage with estrogen, carcinoma of the uterus being the second most common cause. 7 figures.

(The author of this paper is a well known British endocrinologist, and in this contribution he has given a clear exposition of the mechanisms involved in disorders of sex. The classical work of Lillie on the free-martin probably led many to draw extreme conclusions as to the possible influence of the embryonic gonads in the differentiation of sex characteristics, but, as shown especially by Moore, quoted by the author, there is no proof that such is the case. On one point everyone is agreed, and that is that the primary and most important determiner of the male or female direction of sex differentiation has its source in the chromosomal balance of the zygote, in accordance with the concept of Goldschmidt.

Moreover, there appears to be no doubt that the chromosomal sex balance may be disturbed by endocrine influences, the degree of intersexual change being dependent upon the phase of embryological development at which the disturbance manifests itself. The earlier the phase the more profound the sex changes. For example, if an adrenal tumor develops early in fetal life, pseudohermaphroditism is the result. If such a tumor develops in post-natal life, the sex change is much less striking, perhaps consisting only of such changes as hirsutism, amenorrhea, deepening of the voice and hypertrophy of the clitoris.

There are two other statements in Bishop's paper which deserve underscoring. He wisely says that primary amenorrhea should not be diagnosed until after the age of 18. And yet thousands of girls receive organotherapy, chiefly "shots" of estrogen, if menstruation does not appear by the age of 14, 15 or 16. In most of these the function would be inaugurated spontaneously, although ironically enough, the doctor and his unnecessary "shots" are apt to get the credit. Certainly, no direct ovarian therapy is called for before the age of 17, at least, although there is no objection to the employment of thyroid in proper, usually small, doses in at least a proportion of the cases, as an adjuvant to general constitutional measures.

The other cogent statement is that embodied in the last sentence of the abstract, criticizing the abuse of estrogen, nowadays chiefly in the form of stilbestrol, with the hazard of post-menopausal bleeding. In spite of the fact that various authors have called repeated attention to this pernicious evil, it is still widely prevalent.—Ed.)

## ENDOCRINE THERAPY

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Minnesota Med., 30: 33-36, 1947

Endocrine therapy, including the use of thyroid, parathyroid hormone, adrenal cortical extract, epinephrine, estrogenic substances, progestins, androgens, anterior pituitary extracts, pitressin and pitocin and gonadotrophic substances is briefly discussed.

Desiccated thyroid is the most widely used (and misused) of all the hormones. Its use in certain cases of menstrual disorders, sterility, and so forth, is often empiric. The author cites examples of the employment of thyroid in poorly defined conditions.

In reference to estrogenic substances, the writer quotes from a booklet, *Exhibit on Endocrine Products*, published under the auspices of the American Medical Association. "Definite and consistently reliable results have been obtained in only a relatively small number of conditions. These include treatment of the symptoms of the menopause syndrome, natural or artificial, senile vaginitis, kraurosis vulvae, pruritis vulvae, gonorrheal vaginitis of children, hypogenitalism in the female, relief of engorgement of the breasts, interruption of excessive flowing in 'functional bleeding,' palliation of local discomforts from prostatic carcinoma and its metastases. All other indications should be considered unscientific or in the experimental stage of therapy."

Reference is again made to this booklet in regard to preparations of progesterone: "At one time, there was considerable enthusiasm over the therapeutic use of such preparations in dysmenorrhea, menorrhagia and habitual abortion, but the volume of satisfactory evidence is too small to warrant dependence on progesterone for treatment of these conditions."

The author feels safe in saying that the largest amount of androgens is prescribed for nonspecific conditions, particularly such conditions as impotence and the "male climacteric." Encouraging reports have been published of the use of androgens in cases of inoperable carcinoma of the breast.

Prolactin has been advised for the treatment of severe menstrual bleeding, but in general, the results of injection of anterior pituitary hormones have been very disappointing.

Chorionic gonadotrophin has had wide use in treating gynecologic disorders related to real or supposed ovarian disturbance, and in an attempt to overcome female infertility. With the estrogens and progestins, it has been used in an effort to stimulate the normal cyclic hormonal effects.

In conclusion, the writer states that those who indiscriminately inject hormones for poorly defined conditions, and then report good results without controls, are hurting rather than helping endocrinology.

(The author of this article is an experienced endocrinologist whose publications have always been marked by a conservative and sane viewpoint toward endocrine therapy, as is the one abstracted above. Gynecologists will agree with him as to the proper indications for estrogen therapy, as enumerated in the paper. In this limited field, however, the estrogens have been genuine additions to our armamentarium, their most outstanding value being in the treatment of menopausal symptoms. As to progesterone therapy in general, there has been much disappointment as regards both dysmenorrhea and uterine bleeding, while many have become increasingly skeptical as to its value in habitual and threatened abortion.—Ed.)

## SOME FUNDAMENTALS IN ESTROGEN THERAPY

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*California & West. Med., 26: 277-278, 1946*

Certain factors should be analyzed in choosing between oral and injectable preparations of estrogen. Oral administration is useful where frequent dosage is required, such as in amenorrhea where the pelvic tissues require a rapid stimulus to growth, in the suppression of lactation, in certain types of excessive uterine bleeding, and in the resistant menopausal patient, where oral therapy may supplement parenteral therapy. Oral estrogen also has value when small doses are sufficient to produce results, but where it is inconvenient for the patient to visit the doctor for a long period of time. These conditions include the menopause, certain types of abnormal bleeding, and dysmenorrhea, when small daily doses are effective in suppressing ovulation.

The comparative potency of oral estrogens is demonstrated by comparing them to a standard of 1 mg. of diethylstilbestrol. The dosages of the following estrogens are approximately equally as potent: hexestrol, 5 mg.; benzenestrol, 5 mg.; estrone, 2 mg.; estradiol, 2 mg.; estrone sulfate, 2 mg.; and ethinyl estradiol, 0.1 mg. Diethylstilbestrol is probably the most toxic of these agents.

Injectable estrogens also vary in potency and quality of action. In addition, several other factors enter into the choice of an injectable estrogen. These substances are improved in efficiency when their absorption into the blood stream is delayed. The most common method of delaying their absorption is by combination with the fatty acids. The heavier the fatty acid, the more prolonged the action and usually the better the therapeutic effect. This has been dramatically shown by the author's results, already reported, where injections of diethylstilbestrol in dosages of 5 mg. once weekly for 3 weeks relieved the menopausal patient for an average of 3 weeks following cessation of treatment. A similar dosage of the dipropionate induced a therapeutic effect for about 5 weeks, while a dipalmitate had an effect lasting on the average of 9 weeks and not uncommonly as long as 15 or 16 weeks.

The author has found that estrone suspended in water has a prolonged action because the water is rapidly absorbed, leaving a deposit of crystals in the tissues which is relatively long-acting. Recently, the same effect has been demonstrated with diethylstilbestrol crystals suspended in water. In addition to the longer action of the aqueous suspension over the oil solutions, there is the added advantage of freedom from local irritating and allergic reactions at the site of injection.

In choosing the most desirable injectable estrogen, reliance on personal experience must be included. In the author's experience the most powerful acting of the estrogens are estradiol dipropionate and diethylstilbestrol dipalmitate. Rarely does a menopausal patient fail to respond to these agents at doses of 5 mg. once every 2 weeks. The other estrogens are valuable where less potency is required and especially in maintaining a therapeutic effect after the initial results are obtained.

(There is no doubt that, as the author states, injectable estrogens vary in potency and quality, but the fact remains that injectable estrogens are rarely necessary nowadays, in view of the large number of good oral estrogens available, and the obvious advantages of the oral route from the standpoint of convenience and comfort to the patient, expense and flexibility. It may be true that an injection of 5 mg. of stilbestrol will relieve a menopausal patient for an average of 3 weeks, but is it desirable or wise to keep up estrogenic therapy persistently for 3 week periods? I believe not. A far better plan is to give much smaller doses, rarely over .5 mg. nightly, orally, for from a few days to a week or so, with repetition of these short courses only when and if symptoms are sufficiently troublesome to call for any estrogen therapy at all. It is quite certain that postmenopausal bleeding would be a disturbing sequel much less frequently with this plan. See also comment on next abstract. —Ed.)

## PRELIMINARY CLINICAL REPORT ON A NEW SYNTHETIC ESTROGEN, MEPRANE

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*Am. J. Obst. & Gynec.*, 53: 678-681, 1947

The synthetic estrogen, meprane, was used in 52 courses of treatment in 34 unselected patients with the menopause syndrome after castration operations. The ages of the women ranged from 25 to 59 years, and the castration operations had been performed from 2 months to 9 years previously. Clinical symptoms were tabulated at the first visit and a control vaginal smear was taken. An initial dose of 3 mg. daily of meprane was prescribed for 4 weeks. At the end of that time, a second smear was taken and the clinical effect of the drug was evaluated. If good response had been obtained, a maintenance dose of 2 mg. daily was prescribed for the second month after a 10-day period without medication. The estrogenic potency of meprane was measured by comparison of smears. Toxicity

was checked by the usual objective symptoms and was further checked in 15 patients by blood and urine studies.

In this group, 23 of the 34 patients obtained almost complete relief from meprane, 7 were more than 50 per cent relieved, and 4 failed to respond to the drug. Three of the 4 failures discontinued medication after 5, 8 and 21 days, respectively. In 2 of these there was believed to be a large psychogenic factor in their syndrome. Of the other 2 patients, one had had previous stilbestrol therapy and in the other it was later found that the surgeon had left behind part of one ovary; in these cases the complaints may not have been wholly due to estrogen deficiency.

It was found that about two-thirds of the patients given 2 mg. of meprane daily were satisfactorily relieved. The optimum maintenance dose appears to be about 3 mg. daily. Those responding poorly to this will usually do no better even with a doubled dosage.

There were 48 post-treatment smears to compare with the 34 control smears. In all but one case the given dose of meprane maintained or increased that degree of cornification seen in the control smear.

The drug seemed to be remarkably free from toxic reactions when used in doses up to 6 mg. daily for 2 weeks. Blood and urine studies showed no demonstrable effect on the formation of blood constituents or on liver or kidney function. Only 7 patients presented any toxic symptoms; 4 of these were those listed above as failures, and in the other 3 the symptoms were mild.

(My experience thus far with the use of meprane has not been very large, but it leads me to believe that it is an efficient oral estrogen, with less frequent toxic side-effects than those seen with diethylstilbestrol. This should not be interpreted as a commercial plug for the manufacturers of this preparation, because there are a number of other oral estrogens concerning which the same statement might be made.

Of all the oral non-hormonal estrogens stilbestrol appears to be the most effective, but it does have the disadvantage that approximately 10 to 15 per cent of patients cannot tolerate it because of such toxic, though harmless, symptoms as gastric irritability, nausea and vomiting, headache and vertigo. In such patients one can resort to one of the other oral estrogens, either hormonal or non-hormonal. Of the latter, hexestrol, dienestrol, benzeestrol or meprane are all effective in varying degree, so that the dosage has to be properly adapted. All of them, however, seem definitely less toxic than stilbestrol. Manufacturers deserve much credit for their assiduous attempts to perfect these inexpensive non-hormonal estrogens with the object of lessening the incidence of toxic side effects.—Ed.)

## MECHANISM OF ENDOCRINE ALLERGY

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*Acta med. orient., 6: 1-8, 1947*

The mechanism of endocrine allergy has been interpreted on the basis of immunologic reactions, and the principal phenomena of endocrine allergy have been explained in terms of an antigen-antibody reaction.

The appearance of the allergic symptoms during the premenstrual phase or hyperhormonal phase of the menopause is explained as due to a reaction between hormonal allergens and specific antibodies. The allergic reaction appears when the blood hormone level is at a peak, because at this time the amount of free circulating antibodies in the blood is insufficient to protect the original shock organ. A similar explanation is given for the exacerbations which follow injections of large doses of allergenic hormones into hypersensitive patients.

The reactivation of a previously positive intracutaneous test site by a subsequent subcutaneous injection of the allergenic hormone (recurrent reaction) at a new site is considered to be the result of an antigen-antibody reaction between the injected allergen and specific antibodies fixed in the site of the original skin test. A positive cutaneous reaction elicited during the premenstrual phase at the site of an intracutaneous test made many days before (retarded reaction) indicates that the reagins anchored to the new skin shock-site enter into reaction with the hormonal allergen when the latter is secreted in excessive amounts, as is the case during the premenstruum. The same mechanism applies also to the regular spontaneous reappearance of a positive reaction in a previously tested skin site at successive premenstrual periods (periodic retarded reaction).

The induction of positive cutaneous reactions to hormones in normal subjects at a skin site which has been sensitized by serum from patients hypersensitive to the endogenous allergen (positive Prausnitz-Kuestner tests) shows that the serum of such patients contains reagins to the hormonal allergens. This experiment further proves the existence at the skin site of an antigen-antibody reaction between the hormone and the allergic antibody. The induction of positive cutaneous reactions in normal subjects by means of serum of hormone sensitive women at a time when the peak of hormonal level is attained in the normal subject (endogenous passive transfer test) is interpreted as due to a reaction between skin hormone antibodies and the hormonal allergen.

Favorable results obtained in desensitization treatments with small gradually increasing doses of allergenic hormone are attributed not only to neutralization of the reagin in the circulating blood, but also to protection of the original shock organ by formation of new shock organs at the injected skin site. The role of the skin in reactions of endocrine allergy is of utmost importance.

It is felt by the authors that the crystallized hormones and their endogenous counterparts are immunologically identical. However, only in the rare case is there a possibility of sensitization of the body to a hormone as the result of an injection because the atopic individual would become sensitized first to the endogenous hormone. A woman can become sensitized to endogenous hormones at any time of her life provided only that necessary contributory factors are present.

THE METABOLIC EFFECTS OF STEROID HORMONES IN  
OSTEOPOROSIS

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J. Clin. Investigation, pp. 24-56, Jan., 1947

The writers define osteoporosis as that form of under-mineralization of bone in which the primary defect is a hypofunction of the osteoblasts in laying down bone matrix.

The effect of certain steroid hormones (notably estrogens, androgens and progesterone) has been studied in 11 cases of osteoporosis. Five cases were of the postmenopausal type, 2 cases were of the type seen following orthopedic operations (atrophy of disuse), and 3 cases were of the Cushing's syndrome type.

Estradiol benzoate (3.32 mgm. daily to 1.66 mgm. every 3 days intramuscularly) and diethylstilbestrol (1 to 15 mgm. daily by mouth) decreased the calcium and phosphorus excretions in the 4 types of osteoporosis studied.

Testosterone propionate (25 to 50 mgm. daily intramuscularly) and methyl testosterone (40 to 100 mgm. daily by mouth) likewise decreased the calcium and phosphorus excretions in the 3 types of osteoporosis (postmenopausal, senile and Cushing's syndrome) studied.

Progesterone (10, 25 and 100 mgm. daily) had no definite effect whether given alone or in combination with estrogen.

The effect on the calcium metabolism of estrogen and androgen in combination was greater than that of either alone in the postmenopausal and senile groups.

In Cushing's syndrome estrogen probably has a beneficial effect on the calcium balance. However, testosterone compounds have a much more striking effect in this condition, as opposed to other types of osteoporosis.

The authors present a brief discussion of certain therapeutic aspects of postmenopausal osteoporosis. 13 figures.

## IS NORMAL HUMAN URINE TOXIC?

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Proc. Soc. Exper. Biol. &amp; Med., 61: 140-142, 1946

The authors have found that tolerance tests for urine on a surviving organ (frog heart), and on different species of laboratory animals as well as clinical

findings in man prove that human urine is not toxic. The delayed fatal effects which follow the injection of certain urine specimens (7 per cent) into animals are due to infections. Ether treatment renders such urine specimens innocuous not because it removes a toxic substance from the urine but because it is bacteriostatic or bactericidal.

(The obvious clinical implication of this study is in the deaths which occur in laboratory animals after the injection of human pregnancy urine in the performance of the biological pregnancy tests. If the simple ether treatment will eliminate the infections to which, rather than to the urine itself, the authors ascribe this lethal effect, a worthwhile addition to laboratory technique is available.—Ed.)



# THE MENSTRUAL CYCLE

## THE TIME OF OVULATION

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Am. J. Obst. & Gynec., 53: 637-644, 1947

The material presented in this paper was obtained from 100 unselected women who were in active menstrual life. All had menstrual cycles within the limits established for normal. The material consisted of surgical specimens of the ovary, ovaries, or resected portions of ovaries and endometrium. In all instances, day one of the last menstrual period was counted as the first day of the cycle. The 100 patients were operated upon on various days of the cycle; days 3 and 27 were the only days on which no patient was operated upon.

The results show that 54 of the 100 patients had ovulated during the present cycle studied. The range of time of ovulation was from the eighth through the nineteenth days of the cycle. More patients ovulated on days 8, 9, 10 and 11 than on days 16, 17, 18 and 19. More than half of the patients ovulated on days 12, 13, 14 and 15, with the highest peak on day 14. Five patients ovulated on the eighth and ninth days.

All of the 46 patients who had not ovulated during the cycle studied were operated upon between the first and fourteenth days, inclusive. Seven of these were operated upon on day 13, and 3 on day 14; ovulation had not occurred, but in all except one, mature follicles were present in the ovaries.

There were 4 patients who had not ovulated by the seventeenth and eighteenth days, and the ovaries in these cases contained mature follicles, the interpretation being that these patients would have ovulated by day 19, which was the upper limit of the range.

Degenerating corpora lutea of the previous cycle were demonstrated in the ovaries of the 46 patients who had not yet ovulated in the present cycle.

The consistency of various reports indicates that it is possible to estimate the age of corpora lutea reasonably accurately by histologic and cytologic methods. 4 figures.

(It is well to restudy such old problems as this from time to time. The classical studies of Schroeder, Meyer and others, more than a generation ago, as to the chronological relations between menstruation and ovulation, have been confirmed by practically all subsequent workers, and this applies also to this most recent study by Brewer and Jones. The most significant portion of their data would naturally be expected to come from the 54 patients of their series in whom ovulation had occurred. While, like other authors, they showed that the great majority of ovulations occurred between days 12 and 15 inclusive, they also found very wide individual variations. In my experience it is exceedingly rare to find a freshly ruptured follicle before the 9th day of the cycle. I agree with the authors

that it is possible to estimate the age of corpora lutea with reasonable accuracy by microscopic examination, but no such reliable approximation pertains to simple macroscopic inspection at operation, as some would have us think.—Ed.)

## X-RAY IRRADIATION TO PROMOTE OVULATION

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West. J. Surg., 55: 107-113, 1947

It is the author's purpose to show, in a small series of cases, that true (ovulatory) menstruation follows irradiation of the pituitary and ovaries, and that no deleterious effects have been observed. Thus far, no one has been able to show that proper low dosage irradiation has resulted in harm to the patient or offspring.

General examination of these amenorrheic patients reveals no marked abnormality. Slight hypoplasia of the uterus and slight enlargement of the ovaries, which may be cystic, are the most common abnormalities observed. Treatment should never be started without a preliminary pelvic examination and a Friedman test to rule out pregnancy. The basal temperature graph provides an easy way to evaluate the effect of irradiation.

There were 32 patients in the present series, ranging from 18 to 36 years, the average being 26.8 years. The average duration of amenorrhea was 6 months. The percentage of cures was inversely proportional to the duration of amenorrhea; the longer the period of amenorrhea, the poorer the results. Of the 32 patients, 23 (71 per cent) either were restored to normal menstrual rhythm or became pregnant following treatment. Normal menstrual function was proved by basal body temperatures and/or biopsy. Of the 18 patients whose complaint was sterility as well as amenorrhea, 12 (66 per cent) became pregnant. All of the offspring were normal.

Eleven patients received the Edeiken treatment (Am. J. Obst. & Gynec., 25: 511, 1933); 55 per cent had ovulation restored. Using 225 R, 100 per cent of the patients had ovulation restored, and using 300, 60 per cent had ovulation restored. As to sterility: with the lowest dosage, of 8 patients, 5 became pregnant; with 225 R, 3 became pregnant; and with 300 R, 4 out of 5 became pregnant.

Patients with a lower basal metabolic rate were treated with thyroid before x-ray treatment. In no case was thyroid alone sufficient. Six of these patients were improved after x-ray therapy; 3 were not improved.

Patients with uterine hypoplasia were given estrogen in large doses, but it appeared that this priming was of no great value.

(No arbitrary statement can be made as to the advisability or inadvisability and the safety or hazard of x-ray irradiation in the treatment of amenorrhea and the frequently associated sterility. On the one hand, there are numerous reports, like this, of good results with apparently no bad immediate results. On the other hand, we have the warnings of geneticists, on the basis of studies on the lower animals, of possible serious hazard, not necessarily to the immediate offspring, but to later generations. The average gynecologist, confronted as he so often is with cases of a type in which the results of organotherapy and other measures are, to say the least, not striking, may be forgiven if he utilizes a means which often gives more decisive results.

There are many other considerations to be borne in mind in the appraisal of this question. Not a few of the advocates of this plan seem to me to select it on very slight provocation. For example, Haman states that the average duration of amenorrhea in his series was 6 months, indicating that in many it was much less. Personally, I would not think of x-ray therapy in amenorrhea of only a few months' duration, and in such a group simpler and safer means will often restore menstrual normality. For that matter, spontaneous readjustment is not infrequent. Again, the amenorrhea is in itself harmless, and I have seen many cases in which fertility did not seem much lowered in women whose menstrual intervals were 2 or 3 months instead of 4 weeks.

In long standing cases of amenorrhea, extending over perhaps years, and including cases of the primary group, in which other treatment is so characteristically unimpressive, x-ray treatment of the hypophysis or ovaries, or both, is often tried, and in these it also is frequently unsuccessful. These cases constitute a better test of its efficacy than do those of short duration, for reasons indicated above.

It must be admitted that evidence indicating a harmful effect upon the patient or her immediate offspring is very meagre, and the decision as to whether or not it is to be employed rests in the final analysis upon one's attitude toward such evidence as is supplied by the geneticists. I believe it is fair to state that most gynecologists resort to it only rarely, and that has been my own reaction to the problem.—Ed.)

## ETIOLOGY OF PREMENSTRUAL TENSION AND THE RATIONALE OF ITS TREATMENT

W. A. CLINE

J. Bowman Gray School of Med., 4: 137-140, 1946

This writer discusses the various factors which have been proposed as etiologic bases for premenstrual tension by various authors. The first of these is a disturbance of estrogen metabolism resulting in an excess of this hormone.

Frank, finding a high renal threshold for estrogen in 15 patients with premenstrual tension, hypothesized a hormonal pathogenesis for premenstrual tension in certain women who do not excrete estrogen normally. He used calcium lactate alone or in combination with caffeine preparations to increase elimination of this hormone.

Israel suggested that premenstrual tension was not caused by an excess of circulating estrogen but by the presence of unantagonized estrogen. This implied deficient ovarian luteinization with decreased production of progesterone. Endometrial studies in 4 of Israel's patients provided supportive evidence

for this supposition. Such an abnormality may be due to deficient production of the hypophyseal luteinization factor or to a refractory state of the ovaries to the luteinization factor. He reported excellent results in his small series with progestin therapy.

Biskind believed that premenstrual tension was caused by failure of the liver to inactivate estrogen in the presence of a deficiency of factors of the vitamin B complex. He reported prompt results in gynecologic conditions with vitamin B complex therapy.

Greenhill and Freed, in 1940, postulated that premenstrual tension was the result of sodium ion retention by the different tissues of the body under the influence of the ovarian steroids. This retention of sodium is associated with an increase in extracellular fluid in the tissue, giving rise to the neurological symptoms and nausea and bloating of the abdomen. Experimentally, large doses of crystalline sex hormones in both male and female dogs results in temporary retention of sodium, chloride, and water. A recent study showed that 24 out of 50 normal women gained one kilogram or more during the week preceding menstruation, and shortly after the onset of the menses, a diuresis occurred and the subjects lost weight.

Salt restriction combined with the administration of ammonium chloride for 2 weeks preceding menstruation is a common method of treatment for premenstrual tension. The reason for salt restriction is obvious. Apparently, the ammonium ion is changed to urea resulting in an excess of chloride ion. Sodium in the extra-cellular fluid is utilized to combine with this chloride and is then excreted as sodium chloride by the kidney. Water is lost from the extra-cellular space following excretion of the sodium ion.

From the author's discussion, it may be seen that premenstrual tension can be relieved by a number of methods: (1) progesterone and androgen work by neutralization of estrogen; (2) vitamin B acts by permitting the normal destruction of estrogen; and (3) ammonium chloride reduces the sodium retention produced by estrogen. The writer concludes that methyl testosterone administered once daily for from 10 to 7 days before the onset of menstruation appears to be the surest and most convenient therapeutic agent for relief of premenstrual tension.

(Mild premenstrual tension is not by any means rare, and the less frequent severe forms may present difficult problems to both the patient and the doctor. Of the various theories reviewed by the author, that linking it up with sodium ion retention under the influence of high levels of estrogen is the one most generally accepted, and it has good support in the studies of Thorne and others. The ammonium chloride treatment suggested by Greenhill and Freed is often helpful, especially in the less severe cases.

In severe cases the entire personality of the patient may exhibit profound change in the week or 10 days before the onset of menstruation. Tenseness, hyperactivity, a high degree of emotionalism and even mild obsessions and imperative ideas may render the patient mildly psychopathic. In my own experience at least, most of these more pronounced cases occur in women over 40. If the various plans of treatment cited by the author fail to give relief the symptoms may be completely and permanently cured by abolishing the premenstrual estrogenic peaks by abolishing menstruation by means of radiotherapy. In one or two

such cases I have observed a return of periodic tension a year or two after the artificial menopause, associated with a reassertion of menstrual bleeding. In these cases the dosage of radiotherapy had obviously not been sufficient to destroy ovarian function permanently. Additional x-ray therapy was followed by prompt cessation of both the tension and the bleeding. Needless to say, such radical therapy is justified only in patients of the premenopausal group.—Ed.)

## IRREGULAR SHEDDING OF THE ENDOMETRIUM

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*Am. J. Obst. & Gynec., 53: 627-636, 1947*

The writers define irregular shedding of the endometrium as a condition associated with prolongation of menstruation and an increase in the amount of blood loss. It is an abnormality of true menstruation. Histologically, it is characterized by retention over variable periods of time of abnormal amounts of endometrium which has functioned. The endometrium shows abnormalities of the basic endometrial features of menstruation in various degrees of retardation of shrinking, shedding, involution of glands and stroma, and healing.

In a group of 34 cases which were selected at random, the age of onset was less than 25 years in 3, from 25 to 29 years in 6, from 30 to 34 years in 5, from 35 to 39 years in 8, from 40 to 44 years in 9, and 45 years or more in 3. Four patients were nulliparous. In 9 cases, the onset was at the time of re-establishment of menstruation following a pregnancy. This form of postpartum irregular shedding is similar histologically to that of the general group. In this series, the average duration of bleeding per cycle was from 7 to 10 days in 15 from 11 to 14 days in 9, and 15 days or more in 10. In all patients the bleeding was profuse. In half the patients, the cycle was disturbed.

Of the 34 patients, 4 gave a history of previous surgical interference with tubes and/or ovaries. One patient had an endometrial polyp. Three had or had had thyroid disturbances. Nine patients had uterine myomas. Two patients had episodes of endometrial hyperplasia.

Endocrinologically, it has been found that sodium pregnandiol glucuronide is excreted in the urine during the time of the uterine bleeding. In 5 of 6 patients upon whom a histologic diagnosis of irregular shedding of the endometrium was made, pregnandiol was excreted during various parts of the bleeding. In all patients estrogen and 17-ketosteroid excretion was normal. The excretion of pregnandiol during the menstrual bleeding seems to be characteristic of irregular shedding, not having been found in any other naturally occurring condition, and seems to suggest that irregular shedding is a specific endocrinologic entity.

Although no specific treatment can at present be recommended, it has been

the policy of this department to curet these patients for both diagnosis and treatment, and to repeat if necessary. The general physical status is improved and anemia is treated. Of 9 patients in whom the onset of the condition occurred before 30 years of age, curettage and general measures were sufficient in 7. In older patients, x-ray sterilization is the method of treatment of choice after failure of simple measures. Six case histories are briefly summarized. 2 figures.

(The authors of this paper, as well as Holmstrom and McLennan in a more recent contribution (Am. J. Obst. & Gynec., 53: 727, May, 1947) have again called attention to irregular shedding of the endometrium as a cause of prolonged and often profuse menstruation. They explain it as due to an abnormally progesterone effect, and this seems to be correct, on the basis of the hormone studies. The entity is not by any means a new one, as it was described, histologically at least, as far back as 1914 by Driesen (Zentralbl. f. Gynäk., 38: 618, 1914) who applied to it, as I recall it, the designation of *endometritis post desquamationem*. A number of other studies of the subject have been made since then. Curettings from such cases will often show both secretory and non-secretory endometrium, constituting one variety, though not the most common one, of so-called mixed endometrium. —Ed.)

## FUNCTIONAL UTERINE BLEEDING

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M. Clin. North America, 31: 223-235, 1947

A review of the normal endocrinal-uterine relationships is presented as a basis for understanding the cause of functional uterine bleeding. Functional bleeding is encountered most frequently at the beginning and at the end of the reproductive phase.

### *Classification*

Bleeding at puberty occurs in the absence of ovulation from an endometrium in the proliferative phase, an endometrium which has been stimulated by estrogens for a long time. Follicles grow at this time, secreting estrogens to produce endometrial growth, but most of them undergo regression. In some instances endometrial hyperplasia results, the microscopic picture showing the typical "Swiss cheese pattern" of Novak. The onset of bleeding probably results from a long-continued, unopposed estrogenic stimulation, with varying levels of blood estrogen.

Functional bleeding at the menopause results from physiological changes similar to those of adolescence, but in the reverse. The ovaries become more and more refractive to pituitary stimulation. Follicles grow to varying degrees, become atretic or produce follicle cysts. Irregular bleeding in this period

represents long-continued estrogenic stimulation. The endometrium is hyperplastic; sometimes polyps develop. This period will end when the ovaries no longer are responsive to pituitary stimulation.

The diagnosis of functional bleeding during the reproductive years is more difficult, for complications of childbearing are associated with bleeding. The cause of functional bleeding in young women is probably endocrinal in nature. Normal cyclical activity ceases, usually temporarily, and the ovaries may develop numerous follicle cysts. Corpora lutea are absent. The bleeding usually occurs in the presence of a hyperplasia of the endometrium; rarely, some portions of the endometrium may show secretory changes. The origin of the trouble is rarely in the ovaries, more often in the anterior lobe of the hypophysis, and occasionally in the thyroid gland.

### *Treatment*

Functional bleeding during adolescence may need no specific therapy. Active treatment is necessary if the bleeding is very prolonged and leads to a serious drain on the blood. Efforts should be directed toward maintaining good health with outdoor exercise, sunshine and a diet rich in proteins and vitamins. The young girl who has bled sufficiently to embarrass her blood picture should receive more active treatment and careful physical examination. Blood transfusion is the most expedient means of rapidly restoring the blood loss. Usually, a dilatation and curettage is advisable. If the basal metabolic rate is low, thyroid extract (1 grain of thyroid extract for each minus 10 of the basal rate) can be given.

Functional bleeding during the childbearing period calls for a careful history and complete physical examination. A diagnostic curettage is indicated to rule out intrauterine pathology and to provide endometrium for study. A basal metabolism should be routine. Basal body temperatures can be used to study the ovarian cycle and to evaluate the results of medication.

If the failure of normal cyclical changes is in the pituitary gland, it is logical to think that gonadotrophins would prove useful. There is no proof that chorionic gonadotrophin will stimulate the human ovary and there is evidence that it will produce follicle atresia. Equine gonadotrophin will not stimulate follicle maturation and ovulation in the ovaries of women with functional bleeding. Hypophyseal gonadotrophins, or extracts from the anterior pituitary, will stimulate follicle growth in the human ovary, and possibly produce ovulation. The only potent preparations have been used experimentally and are not available for clinical use.

If functional bleeding occurs in the absence of ovulation and corpus luteum formation, the substitution of progesterone should correct the endocrine imbalance and stop bleeding. Treatment is best instituted about 2 weeks after curettage. At least 10 mg. of progesterone is given intramuscularly each day for 5 or 6 days. Usually, bleeding will recur 2 or 3 days after cessation of therapy. This bleeding is the result of breakdown of a progestational endometrium and should last the length of a menstrual period. Therapy should be repeated in

about 3 weeks, and may be continued for 4 or 5 months, following which a normal pattern may be established.

Estrogens are used in treating functional bleeding during the childbearing age. Large daily doses, 5 to 10 mg. of stilbestrol, for 6 or 8 days, will often bring about cessation of bleeding. Hamblen and his associates have recommended that progesterone should follow administration of estrogens, and that they should be repeated cyclically.

Therapeutic amounts of androgens can be used safely. If androgen is given parenterally, no more than 250 mg. of testosterone propionate should be given in any one month in daily doses of 25 mg. Larger amounts of oral methyl testosterone are necessary. Following androgen therapy, a period of amenorrhea of varying lengths ensues. Abnormal bleeding may recur, and the androgens may have to be repeated.

The author stresses several important principles in the treatment of functional bleeding at the menopause. First, the possibility of cancer must be ruled out by careful examination, visualization of the cervix and biopsy of any suspicious lesion, and diagnostic curettage in the absence of gross pathology. Secondly, if malignancy as a cause of bleeding has been ruled out, amenorrhea with the natural menopause can be awaited, unless the bleeding is serious. Thirdly, if the bleeding should not be stopped, an artificial menopause should be produced. Lastly, endocrine therapy must never be used for functional bleeding at this time.

Benign menopausal bleeding can be treated by removal of the uterus, with or without the ovaries, if there are no contraindications to surgery.

Irradiation is effective by destroying the remaining ovarian function. This may be accomplished by intrauterine insertion of radium or by deep x-ray therapy. Irradiation is as effective as surgery, provided there is proper selection of cases. The contraindications to irradiation in this selected group of cases are: (1) uncertainty as to the extent of pathologic involvement; (2) inflammatory conditions of the reproductive tract; (3) previous pelvic surgery; and (4) radiophobia.

Deep roentgen therapy is directed at the ovaries. Usually, the delivery of 400 roentgen units to each ovary will produce a permanent cessation of function. Radium has a twofold action; it inhibits ovarian function, and has a local effect on the endometrium, resulting in sclerosis of the mucosa and vessels of the uterine wall. The enclosure of radium in capsules with a filtration capacity equivalent to that of 2 mm. of brass, and the enclosure of the capsule in a few millimeters of rubber will filter out almost all the alpha and beta rays, so that the resultant radiation consists almost wholly of penetrating gamma radiation which produces a minimum local tissue effect. The capsule should lie in close approximation to the uterine wall and should be within the body of the uterus. The most effective and least dangerous method is illustrated in this paper, in which 2 capsules are inserted in tandem. The upper one, in the uterine cavity, contains the radium, and the lower one, in the cervical canal, is empty. The total amount of irradiation necessary to produce castration consistently is about



1800 to 2000 milligram hours. The duration of the application depends upon the amount of radium used. However, in most instances no more than 50 to 100 mg. of radium are necessary. The effect may take place over a period of 3 to 6 weeks and there may be one, rarely 2, bleeding episodes following treatment. 6 figures.

(This is a very satisfactory and conservative summary of the subject. The author properly advises diagnostic curettage in cases of the premenopausal group, but this curettage is not infrequently of therapeutic value as well. This is especially apt to be true of women in the late forties, who may be presumed to be close to the end of menstrual life. In such cases, following the curettage, it is usually best to mark time and see how they behave menstrually. If the persistence of ovarian dysfunction brings about recurrence of abnormal bleeding, the menstrual function should be abolished with either radium or x-ray, as it can be in virtually 100 per cent of the cases.

In the case of women in their earlier forties the chances for recurrence of troublesome bleeding are greater, especially if the bleeding has been severe and of considerable duration before the curettage. Even in these cases, the expectant plan can often be followed once the curettage has eliminated more serious intrauterine pathology. In other cases the patient has become so disgusted and perhaps depleted by her long and excessive bleeding that she prefers to proceed at once with the radiotherapy. In other words, one must individualize here, as in so many other clinical problems.

Even with the ordinarily fully adequate radiotherapeutic dosage recommended by the author, there will be an occasional case in which menstruation reasserts itself, sometimes even several years after the radiotherapy. In other words, ovarian function may be hard to kill in the occasional case. When a considerable time has elapsed since the original curettage one may feel impelled to do another curettage just to make sure, before additional radiotherapy, that no new lesion, such as adenocarcinoma, has developed.

In view of the virtual infallibility of radiotherapy in women of this premenopausal age group, it is hard to justify the hysterectomies which are so often done, and which would be proper in the occasional case of very intractable bleeding in younger women, for example, in women of 35 to 40 in whom further pregnancies are not important. In this group it is better for the woman to part with the uterus than with ovarian function. But this does not hold good for women who have practically reached the average age of the menopause.

Even in the latter group, however, hysterectomy is the sensible procedure if there is any other indication for laparotomy, such as a recurrent appendicitis. But I confess I do not see why premenopausal women with no gross pelvic or abdominal pathology should be subjected to even the slight hazard of hysterectomy when they can be cured by the far safer and simpler plan of inducing a slightly premature menopause by means of radiotherapy. If a simple hysterectomy is followed by a fatal pulmonary embolism, as is quite sure to be the case in any large series, I can imagine that the surgeon might have some regrets. The risk of such elective surgery is slight, but it is always there.—Ed.)

## UTERINE BLEEDING: PUBERTY, MATURITY, POST CLIMACTERIC

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South. Surgeon, 13: 72-77, 1947

The author discusses normal menstrual bleeding, the irregular flow of adolescence, the menopause and the problem of malignancy. The "growth wave theory" of menstruation is one of the most plausible explanations of both normal and abnormal uterine bleeding. Stimulated by the pituitary, the ovaries secrete cyclic waves of estrogen which cause growth and regression of the endometrium. When the vasoconstriction of the arterioles relaxes, bleeding ensues. Functional bleeding is more frequent near the menarche and climacteric, when the relationship between the pituitary and ovary is unstable.

Actual ovulation does not take place for several years after the initial secretion of estrogen in the menarche. During that time the ovary has anovulatory cycles with varying amounts of estrogen production which may at times result in profuse and prolonged bleeding episodes. Uterine bleeding of this type can be controlled by large doses of estrogen until blood loss has been compensated for and the general health improved. Where thyroid is indicated, tolerance doses should be given.

In the mature woman, organic causes of bleeding come to the fore, with complications of pregnancy the most common. Threatened abortion and retained placental tissue are most frequently encountered, but other possibilities are placenta previa, hydatidiform mole, premature separation of the placenta and chorio-epithelioma. Curettage with microscopic examination of the removed tissue will usually secure the diagnosis. Malignant tumors cause much anxiety; biopsy of the cervix and curettage of the fundus should indicate or clear the uterus. Benign tumors, such as fibromata and endometrial polyps, are very common causes of uterine bleeding. Occasionally, a polyp will react to progestin causing a secretory endometrium. In endometrial hyperplasia, curettage and careful microscopic examination of the removed tissue are indicated.

Endometrial biopsy is invaluable as an office procedure in the diagnosis of functional bleeding if taken during the first few hours of menstruation. In all women over 30 years of age who have excessive or prolonged bleeding, curettage and careful microscopic examination of tissue are important to rule out malignancy.

Functional bleeding can be controlled immediately by large doses of estrogen. Curettage will furnish temporary hemostasis, allowing time for improvement of anemia.

Thirty to 50 per cent of uterine bleeding after the menopause is due to cancer. Therefore, careful examination of the cervix, fundus and ovaries for possible

malignancies is important. Suspected cervical lesions should be biopsied. In other unexplained bleeding, the fundus and cervix should be thoroughly curetted and the material studied.

The writer summarizes 107 cases of irregular bleeding. The ages ranged from 14 to 69 years. There were 267 biopsies with an average of 2.4. In 14 per cent of cases placental tissue was found. There were 3 instances (2.8 per cent) of malignancy. The ages of these patients were 26, 51 and 59 years.

(A very satisfactory short review of a big subject. I agree with the author as to the great value of endometrial biopsy, more especially in the study of functional disorders, especially bleeding and sterility. When there is any suspicion of cancer, however, there is too much at stake to trust to anything short of very thorough and careful curettage, and for this a short anesthesia, usually sodium pentothal, is usually essential. Hospitalization, however, is not usually necessary.—Ed.)

## FURTHER STUDIES ON THE CONTROL OF MENORRHAGIA

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*J. Clin. Endocrinol., 6: 675-687, 1946*

In this study the writers discuss the treatment of functional uterine bleeding by various methods utilizing steroid hormones. A method which employs the combined administration of testosterone propionate and progesterone is presented as the method of choice. The concomitant use of these steroids has resulted in rapid and efficient control of uterine hemorrhage.

In this study the following steroid hormones were administered parenterally: estradiol benzoate, progesterone and testosterone propionate were administered singly; progesterone, in combination with either estradiol benzoate or testosterone propionate, was also employed. No attempt was made to control uterine bleeding by any surgical procedure prior to beginning endocrine therapy. Endometrial studies were made throughout the study and after therapy in many patients.

Although hemostasis was adequately accomplished by the use of estrogenic substances, the subsequent withdrawal bleeding was often as profuse as the initial episode. Gradual reduction in the amount of hormone given is a tedious process and does not assure that withdrawal bleeding will not ensue. However, it is emphasized that estrogens do have a definite place in the control of functional uterine hemorrhage. The examination of the endometrium soon after the arrest of menorrhagia by estrogenic therapy usually shows a hyperplastic or proliferative endometrium.

Bleeding may not be controlled during progesterone therapy. Upon discontinuation of progesterone an increase in bleeding may occur, but complete

stoppage within 6 to 10 days after the last progesterone injection is the rule. When bleeding is thus arrested "according to plan", shedding of the endometrium frequently occurs, comparable to that which is observed in normal physiologic menstruation.

When moderate doses of androgenic therapy are employed and bleeding is arrested, the endometrium is maintained apparently in the same status as prior to therapy. Approximately 50 per cent of the authors' cases have benefited by the administration of 25 mg. of testosterone propionate for 4 to 6 days.

The method of treatment of choice, combining testosterone propionate and progesterone, has proved the most promising and ideal in the management of menorrhagia. The testosterone propionate is employed for hemostatic propensities upon the uterus while the progesterone is incorporated to induce desquamation of a hyperplastic or malfunctioning endometrium. The mode of therapy consists of 3 to 5 consecutive daily injections of combined doses of 25 mg. of testosterone propionate and 10 mg. of progesterone. Bleeding is thereby frequently controlled on the first to second day of therapy. A period of amenorrhea follows for 2 to 4 days, and is subsequently followed by withdrawal bleeding. The latter lasts 4 to 6 days. Subsequent salvage of the patient may depend upon continuing the same form of therapy at monthly intervals until resumption of normal menstrual cycles may be attained. 5 figures.

(If you're running short of methods of treating functional uterine bleeding, here is another one for you to try. Whether or not it has any advantage over other methods I am sure I do not know, nor do I feel sure as to the rationale behind the authors' recommendation of the plan.—Ed.)

## MASSIVE INTRAPERITONEAL HEMORRHAGE CAUSED BY RUPTURE OF HEMORRHAGIC CORPUS LUTEUM

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Ohio State M. J., 43: 168-169, 1947

A 13-year-old female was referred to the author with a history of colicky pain in the right lower abdominal quadrant which had begun 2 days previously and had varied in severity, subsided for one day and then recurred. Upon admission to the hospital on May 13, the temperature was 100, pulse 120, respirations 28. Blood examination revealed: R.B.C., 3,980,000; W.B.C., 24,850; Hb., 84 per cent; Polys., 82 per cent. The last menstrual period had occurred on April 20, and had been scanty.

No abdominal distention was noted; there was generalized tenderness indicating peritoneal irritation. Symptoms of shock were not evident.

In making a diagnosis, appendicitis and ruptured ectopic must be considered. In the condition described in this paper, the great majority of patients have

pain in the second to fourth week of the cycle, i.e., from ovulation to menstruation, and this holds for massive and discrete hemorrhage.

At operation, the abdomen was filled with blood, most of it fluid, with some clots. The right ovary was enlarged and appeared as though it had exploded. Hemorrhage was coming from the ovarian lacerations; this was controlled, the right tube and ovary were removed and the abdomen was cleansed and closed. Recovery ensued.

The specimen consisted of portions of blood clot to the amount of 107 grams, and a tube and ovary which measured 6 by 3 by 2.5 cm. An irregular "H" shaped rent in the ovary measured  $2\frac{1}{2}$  cm. and about 6 cm. vertically. Two-thirds of the ovarian mass was composed of a blood clot with portions of thin yellow tissue suggestive of lutein cells. The portion of ovarian tissue showed a number of follicular cysts. Microscopically, sections of the blood clot showed portions of tissue consisting of a layer of lutein cells in a convoluted arrangement. Sections of ovarian tissue confirmed the gross impression of follicular cysts. The diagnosis was rupture of hemorrhagic corpus luteum with abdominal hemorrhage. 1 figure.

(The possibility of intraabdominal hemorrhage of ovarian origin must always be borne in mind in patients with severe lower abdominal pain associated with symptoms of abdominal bleeding. Much more frequently such symptoms are due to tubal pregnancy. However, when pelvic palpation is negative for any adnexal enlargement and the fairly characteristic menstrual history of tubal pregnancy is lacking, an ovarian source of the bleeding must at least be thought of as a possibility. The diagnosis is most often not made pre-operatively, to judge from the reports of the several hundred cases now in the literature.

When the right ovary is the source of the bleeding, and the bleeding is of slight or very moderate degree, the condition is most likely to be mistaken for appendicitis. More often, however, and especially when the bleeding is free, a ruptured tubal pregnancy is suspected. It is usually not necessary to remove the affected ovary, and often a single figure-of-8 or mattress suture will control the bleeding effectively, although resection of the ovary is necessary at times.

The bleeding may have its source in either a follicle or a corpus luteum. In the latter case it is likely to occur in the vascularization phase, during which slight bleeding normally occurs within the lumen of the corpus. If such bleeding is exaggerated, it is easy to see how it may break through into the peritoneal cavity.—Ed.)

## VULVA AND VAGINA

### LEUKOPLAKIA AND CARCINOMA OF THE VULVA

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J. Indiana M. A., 40: 338-340, 1947

This study comprises a series of 17 cases of leukoplakia of the vulva, of which 5 developed carcinoma. This report reaffirms more extensive studies of other workers that surgical treatment of leukoplakia is definitely important in the prevention of carcinoma.

The average age in this series of cases was 51 years, the aged varying from 33 to 71 years. The duration of symptoms varied from 6 months to 5 years. Fifteen of the cases had received previous treatment with local medication, 5 had received estrogen therapy and 5 had been treated by x-ray. Three of the 5 cases in which carcinoma developed had previously been treated with x-ray. Following its use there was no relief of symptoms and no retardation of the growth.

In 9 cases of leukoplakia, one with early carcinoma, where simple vulvectomy was done, there was complete relief of symptoms and no recurrence of malignancy. Simple vulvectomy was done for palliation in 2 cases of advanced malignancy; both patients have died of metastatic carcinoma. Inguinal gland resection was performed with vulvectomy in 2 cases of moderately advanced malignancy, and both of these patients are alive, 2 and 10 years later, respectively. In one patient, aged 36 years, local excision of skin less than the entire vulva was done. There has been no further involvement to date.

When carcinoma of the vulva is present the only hope of cure is vulvectomy and inguino-femoral gland resection.

(This study confirms the general impression that leukoplakia very definitely predisposes to the development of carcinoma of the vulva. The figures usually quoted are those of Taussig, who found that 50 per cent of carcinoma cases were preceded by leukoplakia. Whatever the actual incidence of carcinoma development may be, it is certainly high enough to impress one with the hazard of temporizing too long with non-surgical treatment, especially as this is almost always unsuccessful. I do not believe that I have ever seen a case of leukoplakia which was benefitted by estrogen or by x-ray therapy.)

The first thought of many physicians in the treatment of severe vulvar pruritus is likely to be estrogen. In an occasional case of menopausal itching associated with atrophic changes in the vulvo-vaginal mucosa, there may be some benefit, usually temporary. But leukoplakia is a skin disease not characteristically associated with cessation of ovarian activity, it is likely to be associated with hypertrophic rather than atrophic changes, and it is not helped by estrogen therapy. Its causation is not known.

The pathologic changes in leukoplakia are not of stereotyped nature. The surface epithelium may be greatly thickened and highly keratotic with a very acanthotic tendency, but in other lesions, or in different parts of the same lesion, it may be thinned out, with very little keratosis or parakeratosis, and with little or no deepening of the epithelial pegs. As

a matter of fact, the tendency in the late stages may be a definitely atrophic one, and some authors include this atrophic stage of leukoplakia within the category of kraurosis. The latter term etymologically means a condition of shrinkage, and its use would seem better limited to lesions characterized initially by marked atrophy. Sometimes these are menopausal, and represent what is apparently an extreme degree of the atrophic changes which in mild degree characterize the normal menopause. But similar atrophic changes are sometimes seen in much younger women. Such cases may perhaps be explained by extreme refractoriness of the vulvar tissues of some patients to the trophic influence of estrogen, or perhaps they represent types of atrophic vulvitis of unknown causation. When one remembers that even the "pure" forms of kraurosis may be secondarily infected, with atrophic vulvitis as a result, the confusion and overlapping are all the more apparent.

The clinical appearance of leukoplakia, however, is quite distinctive. The whitish, parchment appearance of the skin, with often cracks, fissures and scratch marks, is difficult to mistake. The history of long standing and unbearable itching, day and night, is also quite characteristic. Occasionally the skin lesion is localized in a small area of the vulva, and excision of such an area is simple and effective. More often, however, the disease involves all the vulvar structures, including the labia majora and minora.

Even then the surgical problem is not a difficult one, nor is the operation of simple vulvectomy as mutilating as one might think. If done properly, the result is a vulva which is simply flatter than a normal one, and considerably less hairy. The functional result is also good if proper technique is used. To avoid any cicatricial contraction of the orifice, with resulting dyspareunia, it is of great importance to mobilize very freely the posterior vaginal mucosa, and to evert it in suturing it to the margins of the skin.

The plastic problem is a little more difficult when, as is often the case, the leukoplakic disease involves the skin of the perineum extensively, down to and even surrounding the anus. The ingenuity of the surgeon is sometimes put to a test in excising all the diseased skin without producing ugly and even incapacitating cicatricial ridges. Tension in suturing should always be avoided, and this can generally be accomplished by utilization of the plastic principle of free mobilization and sliding of the skin flaps. In spite of the most complete excision, later extension of the lesion may occur in these advanced cases, requiring secondary excision.

I have said nothing as to the use of Vitamin A in the treatment of leukoplakia, because I have as yet had no experience with it, and thus far the only report on the subject appears to be that of Hyams and Bloom, who report excellent results. The method is too new to permit of evaluation at this time, but it is so simple that it should certainly be tried before resorting to the surgical treatment which has hitherto been accepted as the best method of management. (See article by Hyams and Bloom: *Am. J. Obst. & Gynec.*, 53: 214, 1947, abstracted in the August, 1947, Survey.)

As for the treatment of those cases in which cancer has developed, radical vulvectomy by the so-called Basset technique has been accepted as the ideal procedure, chiefly on the recommendation of the late Fred Taussig, from his experience in a large group of cases. However, it is not always feasible, especially in old and debilitated patients, as many of this group are. As a matter of fact, there are a number of reports of good results from much simpler procedures, such as those recently reported by Watson and Gusberg (*Am. J. Obst. & Gynec.*, 52: 179, 1946, abstracted in the December, 1946, Survey, p. 879). In Bickel's group, at least one patient with cancer had only a simple vulvectomy, with no recurrence, though this would not ordinarily be accepted as an adequate plan of treatment.—Ed.)

## THE UTERUS

### UTERINE ADENOMYOSIS

#### INCIDENCE, SYMPTOMS, AND PATHOLOGY IN 1,856 HYSTERECTOMIES

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*Am. J. Obst. & Gynec., 53: 663-668, 1947*

To the writers, adenomyosis of the uterus means heterotopic endometrium found within the myometrium, derived from the endometrium, but often losing such a connection as the process advances. It may occur diffusely, or locally in a small area. It is a distinct pathologic entity, not physiologic or neoplastic. In the authors' experience, the misplaced endometrium usually resembles the basal glands, but Novak states that both the cyclical changes of menstruation and the decidual changes of pregnancy may be seen in the invading endometrium of adenomyosis.

The present study includes 1,856 hysterectomies for all causes performed over a 15-year period at a private hospital. Adenomyosis was found in 517 cases, an incidence of 27.8 per cent. The greatest incidence occurred in the fourth decade (259), with 120 in the third and 100 in the fifth decades. Ages varied from 27 to 73 years. Thirty-eight patients were under the age of 35 years, and 9 were between 27 and 30 years. In each of these, adenomyosis was the chief factor, if not the only one, which caused enough distress to warrant operation.

Because of the often associated leiomyoma which make evaluation of symptoms difficult, the authors consider separately 110 cases of advanced adenomyosis without associated pathology. In this group, menorrhagia was the most common symptom (85 cases). Other complaints were: dysmenorrhea, 61; metrorrhagia, 42; pain before periods, 23; dysuria and frequency, 9; pain radiating down legs, 7; bearing down feeling in pelvis, 6; and nausea and vomiting, 5. Thus, nearly every case had some menstrual irregularity or dysmenorrhea.

On bimanual examination, usually a globoid, slightly enlarged and tender uterus was found. In the 110 cases of adenomyosis alone, tenderness on bimanual examination was present 60 times. When leiomyomas were associated with adenomyosis, the uterus was more tender than when leiomyoma alone was present.

In this study it was not possible to correlate endometrial hyperplasia with adenomyosis; the endometrium was normal in many instances.

Adenomyosis occurs independently or associated with other uterine pathology, and it is concluded that it presents a definite symptomatology which can and should be recognized and diagnosed preoperatively.



(The incidence of adenomyosis, as reported by the authors, is surprisingly high (27.8 per cent of all hysterectomies), higher than would probably be noted in most laboratories. While the lesion is easy enough to diagnose microscopically, one not infrequently encounters cases in which the endometrium dips down in only small pegs here and there, and in which the sections show no deeply seated islands well separated from the surface. One would hesitate about classifying such cases as adenomyosis. The endometrial basalis normally is placed directly upon the muscularis, fitting into the interstices of the latter, and minor variations in this respect have no significance.

The authors state that they found no connection between endometrial hyperplasia and adenomyosis, probably referring to the mechanisms involved. I feel sure, however, that they must often have observed a co-existence of adenomyosis with endometrial hyperplasia on the surface.

The statement is often made that the ectopic endometrium of adenomyosis, like that of pelvic endometriosis, reacts to the ovarian hormones like the normal endometrium. This, however, is true in only a small fraction of the cases. Much more often the aberrant endometrium is of immature type, responding only to estrogen but not to progesterone. This is true even in those cases of endometriosis in which bleeding, with not infrequently definite chocolate-filled cysts, is seen. This illustrates that endometrial bleeding takes place just as readily from a purely proliferative endometrium as from one which has undergone the full estrogen-progesterone sequence of effects.

In the occasional case, however, a definitely secretory response is seen in the aberrant endometrium of either adenomyosis or endometriosis. For that matter, either may exhibit even definite decidual change if pregnancy supervenes. We are now studying this problem of the varied reactions of ectopic endometrium in our laboratory, and a report on this subject will be published in the near future.—Ed.)

## LEIOMYOFIBROMA OF THE UTERUS AND ENDOMETRIAL CARCINOMA

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*Am. J. Obst. & Gynec., 53: 846-850, 1947*

The frequent coexistence of fibromyomas of the uterus and endometrial carcinoma has been the subject of considerable conjecture and investigation regarding its significance from both clinical and etiologic standpoints. However, it has never been satisfactorily established that the high incidence of fibroids can be considered as peculiar to or characteristic of corpus carcinoma, and not just simply a reflection of the frequent occurrence of fibromyomas.

Reports on the coexistence of fibroids with endometrial carcinoma give such percentages as 20.8 by Meigs; 34.9 by Norris and Dunn; 38 by Healy and Brown; 36.4 by Masson and Gregg; and 37.8 by Scheffey, Thudium and Farell. From the other point of view, regarding the incidence of carcinoma among fibroid uteri, the statistics, though considered significant, are not so striking. Kelly and Cullen found 1.7 per cent of 1,400 myomatous uteri to have corpus carcinoma also. Other authors report figures in the vicinity of 1 or 2 per cent, with the exception of 9.9 per cent in a small series reported by Falls.

In order to remedy the surprising dearth of information on this essential and basic point, the author made a study of hysterectomies at Harper Hospital. From 1939 through 1943 there were 2,246 abdominal hysterectomies done on various indications. There were in this series 1,672 myomatous uteri, or 74.5 per cent. Of these, the diagnosis of fibromyoma was primary in 1,389 cases and secondary in 283 cases. This leaves 574, or 25.5 per cent of the entire series, entirely free of fibroids.

Included in the 2,246 hysterectomy cases were 44 in which carcinoma of the uterine body was present. It is pointed out that the figures given here are very questionable as an indication of the actual incidence of endometrial carcinoma, but they are presented only as probably of considerable value in suggesting the relative occurrences with and without fibroids. These 44 instances of corpus carcinoma in the series of 2,246 give an incidence of 2 per cent. For the 1,672 uteri with the diagnosis of fibromyoma, the occurrence of carcinoma was 15, or 0.9 per cent. However, among the 574 uteri of the series without leiomyofibromata, there were 29, or 5.1 per cent, with carcinoma of the endometrium.

Since these findings were so contrary to what was expected from statements in the literature, a comparison in another direction was made as a check. A group of uteri from patients with endometrial carcinoma was contrasted with another series of the same size which was comparable as to age and other factors, except that uterine malignancy was absent. The previously used 44 instances of endometrial carcinoma treated by hysterectomy were increased to 50 by the addition of 6 similar cases from 1938 and the first 2 months of 1944. The 50 cases for contrast were found after a search through the abdominal hysterectomy records from 1939 through the first half of 1944. This group included only those cases in which the uteri were removed for reasons *other* than fibroids. The 2 groups were comparable in marital status, parity, menstrual status and race. Comparison of the 2 groups shows in every instance a fairly close agreement between the 2 series, rather than an increased incidence of fibromyomas for the cancer group. The incidence of fibroids in the cancer group was 36 per cent; in the non-cancer group it was 46 per cent.

These data reveal no evidence to indicate that fibromyomas of the uterus and endometrial carcinoma have an affinity for each other, but rather just the reverse.

(Opinions and statistics as to the relationship of uterine myoma and endometrial carcinoma have varied greatly, as the author states. That these two lesions so often coexist is not surprising in view of the great frequency of myoma, but such coexistence cannot of course be interpreted as indicating any predisposing influence toward endometrial carcinoma on the part of myoma. The incidence of 0.9 per cent of carcinoma in Siddall's large group of myomas seems lower than one would expect, and is actually lower than that reported by most authors. On the other hand, uteri without myomas showed an incidence nearly 6 times as great. Some of our amateur statisticians might even deduce from this that the presence of a myoma would offer a measure of protection against the development of endometrial cancer.

From a purely theoretical standpoint there would seem to be no reason to expect that the presence of myoma would predispose to endometrial adenocarcinoma, except possibly in the case of submucous growths, associated as they often are with ulcerative and inflammatory changes, though on this limited point we have no statistical evidence. Certainly

Siddall is fully justified in applying the old Scotch verdict of "Not proven" to the concept that there is any sort of affinity between the two lesions.—Ed.)

## A 55-POUND SOLID UTERINE MYOMA

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*Am. J. Obst. & Gynec., 53: 839-845, 1947*

Successful removal of uterine myomas weighing more than 25 pounds has been authentically reported by Hill, Webster, Cullen, Farmer, Marshall and Stevens. The tumors in the cases of Webster and Cullen weighed 87 and 89 pounds, respectively, and were cystic.

The writers report the case of a 59-year-old woman who was admitted to the hospital complaining of abdominal enlargement, inability to walk, orthopnea, marked weakness, etc. She had first noticed an orange-sized mass in the lower abdomen 17 years previously. Menstruation had ceased at the age of 42 years. There were no known pregnancies. There had been loss of adipose tissue for 4 years, night sweats, palpitation at times, dependent edema for 4 or 5 months, and chronic constipation. There were no urinary symptoms.

On admission, the temperature was 100.6 degrees F., pulse 100, respiration 30, weight 145 pounds, height 56 inches, circumference of abdomen 51½ inches and blood pressure 130/78. Emaciation was marked. There was upward and outward displacement of the lower ribs and the xiphoid process was displaced cephalad. Moist rales were heard over the lung bases. The heart was displaced laterally. The cervix uteri could not be palpated, as it had been drawn up by the pelvo-abdominal tumor. The mass filled the pelvis and could not be displaced. The uterus could not be outlined, nor were the ovaries palpable. The mass encroached upon the anterior wall of the rectum and external hemorrhoids were present. The urine showed a specific gravity of 1.015, a trace of albumin, innumerable leucocytes and many Gram-negative bacilli.

A high caloric, vitamin rich diet was begun, an indwelling urethral catheter was inserted and sulfathiazole was given to combat urinary infection. Blood transfusions and supplementary fluids were administered.

At operation, exploration through a short infraumbilical incision ruled out the possibility of the mass being a cyst. A blood transfusion was begun and the incision was extended to the xiphoid process and to the symphysis pubis. Every accessible blood vessel to and from the tumor was clamped, severed and ligated. The right ureter measured about 2.5 cm. in diameter. Multiple adhesions were freed and the tumor was removed in toto. The blood pressure

fell to 60/40 and the pulse increased to 135, but the patient responded to ephedrine sulfate and increased blood administration. Hot packs were used to control bleeding from areas which could not be sutured or ligated. There was sufficient peritoneum to permit satisfactory covering of denuded areas. After abdominal closure, a pressure dressing and 2 sand bags were applied.

The tumor weighed 55 pounds and measured 17 inches in its greatest diameter. It was solid except for a few very small cystic areas. The microscopic diagnosis was leiomyoma with degeneration, acute and chronic inflammation, and no evidence of malignancy.

Postoperatively, citrated blood, intravenous fluids and plasma were administered. Wangenstein suction was employed for the first 2 days. The sand bags were removed from the abdomen after 24 hours. On the sixth day the patient developed diarrhea. Her condition gradually improved, and on the twenty-fifth postoperative day she weighed 70 pounds and was able to walk without assistance. Six months later she weighed 124 pounds and the circumference of the abdomen was 34 inches. When last seen, at the age of 63 years, she was in excellent physical condition. 3 figures.

(Not only the size of the tumor but the poor general condition of the patient made this anything but a hand-picked case, not to speak of the technical difficulties of tumors of this size and vascularity that fill the pelvic cavity so tightly that it is anything but easy to get at the blood vessels for ligation. The surgeons are to be congratulated on the happy outcome.—Ed.)

## PROGESTERONE THERAPY OF UTERINE FIBROMYOMAS

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J. Clin. Endocrinol., 6: 699-700, 1946

Three patients who had uterine fibromyomas which could be well outlined by roentgenographic procedures, and who were menstruating regularly, were given daily intramuscular injections of 20 mg. of progesterone in 2 cc. of peanut oil. The progesterone was administered for 39, 61 and 47 days, respectively. In order to determine the effect of therapy on the size of the fibromyomas, the authors employed roentgenography with intrauterine instillation of radiopaque oil and interperitoneal injection of carbon dioxide or either of the two alone. The therapy produced no change in the size of the fibromyomas. The size and contour of the tumors at removal after the conclusion of this study were as expected from the roentgenograms.

The writers emphasize the importance of objective means of evaluating this important subject. For example, they felt that by bimanual examination there was a definite reduction in the size of the fibromyoma in one patient, but roentgenograms and with contrast medium showed no such change.

The effect of hormonal therapy on the uterine tumors by histologic examination is now being studied.

(The findings reported by the authors are not at all surprising, although it is just as well that someone resorted to such an objective method of showing the inefficacy of a method which almost *a priori* seemed unsound. It will be recalled that such progesterone therapy for uterine myoma was recently recommended by Goodman (J. Clin. Endocrinol., 6: 402 1946), abstracted and commented upon in Survey, 1: 703, Oct., 1946). To save the reader the trouble of looking up the previous comment made on Goodman's paper, I may quote from myself as follows: "I do not believe that there is any sound basis for this plan of therapy, or that the experimental studies of Lipschütz and his co-workers offer any justification for its employment in the human. The tumors produced in guinea pigs by estrogen administration are not myomas but fibromas, nor do they occur in the uterus. . . . They are not true tumors, since they disappear after the estrogen is withdrawn, or after administration of progesterone. But this, as far as I can see, has nothing to do with the etiology of uterine myoma, as Lipschütz himself was only too ready to concede when I discussed the matter with him on the occasion of his visit to this country some years ago. Moreover, with a large proportion of uterine myomas, probably the majority, ovulation occurs quite normally. . . . The tumors, in other words, may continue to grow even though the patient's corpora lutea are supplying her with progesterone. The author will have to produce much more evidence than his impressions of a possible effect in 7 cases, especially since his premise seems so unsound."—Ed.)

## SELECTIVE CYTOLOGY SMEAR FOR DIAGNOSIS OF CANCER

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*Am. J. Obst. & Gynec., 53: 609-617, 1947*

The squamous cells encircling the tiny cervical opening at the squamocolumnar junction constitute a key point of origin for cancer more frequently than any other single focus in the female. In an attempt to find a method of studying evidence of cancer growth in this site, the author reports the development of the selective cytology technique.

This method requires first adequate exposure of the cervix with a bivalve speculum. The mucus at the external os is aspirated or wiped off. Following removal of mucus, the squamocolumnar junction is visualized. The selective cytology smear is then obtained by means of a spatula, the precise method varying according to the type of cervix. The entire squamocolumnar junction of the nulliparous cervix is scraped throughout its circumference. Parous cervices, which commonly exhibit a larger portion of reddish glandular cervical epithelium are scraped by the spatula along the squamocolumnar margin at the most suspicious area. The spatula test provides "surface biopsy" information of these squamous cells prior to their actual desquamation. (Other cytology techniques depend upon detection of cells already exfoliated into body secretions for cancer diagnosis.)

By study of these cells in selective cytology smears, morphologic changes have been identified which are believed to constitute a precancer cell-complex. These changes are as follows: (1) Cornified cells whose nuclei are abnormally large and deeply staining. (2) Multilobulation and splitting of the nucleus into several separate nuclei in cornified and precornified cells. (3) Anaplastic deep squamous cells showing considerable nuclear variability. (4) Abnormally high cornification. Many of these so-called pre-cancer cases have shown clinically normal cervixes.

The selective cytology technique has been found to be more accurate as an indicator of endogenous estrogen by cornification counts in smears from the cervix and vagina in cancer cases. The previous aspiration method fails in this respect because of excessive amounts of blood and leucocytes.

Selective cytology may be used in the diagnosis of any accessible surface cancer, such as the tongue, lip, throat, skin and vulva.

It is concluded that through early diagnosis of cancer by routine cytology tests, death from cancer of the cervix should become highly preventable. 10 figures.

(The author of this paper has been one of the most assiduous workers in the field of vaginal cytology as applied to cancer diagnosis. As to the general question of the value of vaginal smear study, it is not necessary again to elaborate, as I have commented upon it rather fully on several occasions during the past year or so. With full appreciation of the value of such studies, and the desirability of their continuance by those qualified to make them, it is my own feeling that their place in cancer diagnosis is being a bit overaccented.

Even the experts feel that they do not possess the decisive diagnostic value of properly performed biopsy, and that for the present their chief value would seem to be as screening tests. And yet I have already encountered a number of instances in which vaginal smears were employed in place of biopsy by men whom I do not consider to be well trained cytologists. In one such case a biopsy was not done for several months later, and it then revealed a cervical carcinoma which had not been diagnosed by the amateur cytologist who depended on the smear.

This is of course not a criticism of the method but of its misapplication, but it is just such misapplication which is inevitable with a diagnostic method which has been so much publicized. Pathologists may also make mistakes in the diagnosis of biopsy specimens, but not so often, and there are far more reasonably competent tissue pathologists than vaginal cytologists.

I do not believe that many cases of actual cancer are missed by biopsy and curettage in well-staffed clinics and laboratories. This may not apply to the very earliest preclinical stages of cervical cancer, but these represent only a tiny proportion of the total cases. The hitch in these preinvasive or exceedingly early invasive lesions is that it is difficult to know where to make the biopsy in a cervix which may be grossly normal.

In such cases the method described by Ayre of employing a little spatula to scrape thoroughly the region of the external os is likely to give a much more comprehensive idea of the whole surface epithelium than would a single or perhaps several biopsies. It is essentially the same principle of surface scraping as that advocated by Schiller many years ago, and I myself have employed it frequently for many years, using either a knife or a small sharp curette for the scraping. Only a tiny bit of tissue is thus obtained, and it is best studied in smear form. I do not believe that the perfect instrument for this surface scraping has yet been devised. After the scraping a finely granular, slightly oozing surface may be left, but this very quickly regenerates.—Ed.)

SUCCESSFUL REPAIR OF A VESICOVAGINAL FISTULA  
COMPLICATING CARCINOMA OF THE CERVIX

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Am. J. Obst. &amp; Gynec., 53: 694, 1947

The case presented in this paper is of interest in that the appearance of a vesicovaginal fistula in a patient with carcinoma of the cervix usually means that the tumor has spread so extensively that there is little hope for a permanent cure. This patient, a 58 year old para i, complained of weakness and bloody vaginal discharge, and was found to have a cauliflower-like mass originating in the cervix and filling the upper vagina. There was moderate infiltration of the parametria.

The patient was given deep x-ray therapy (total dosage of 4,000 r). Subsequently, a total of 2,500 mg. hours of radium was implanted. Examination at the time of radium implantation disclosed a vesicovaginal fistula 1.5 cm. in diameter about 2 cm. anterior to the cervix.

When, after  $2\frac{1}{2}$  years, it was evident that the tumor had been successfully eradicated, an attempt was made to repair the fistula. The opening was surrounded by dense scar tissue. The edges were excised, the surrounding tissue mobilized, and the bladder closed with a continuous suture of 0-20 mg. chromic catgut. Following operation, the patient had good control of urine and the fistula has remained closed now for  $1\frac{1}{2}$  years.

(Fistulas arising in the course of cervical carcinoma treated by radium, whether vesicovaginal or recto-vaginal, should not be considered hopeless, as the present case demonstrates. I had a somewhat similar one several years ago, and I have no doubt that occasional cases of this type have been noted in other clinics. It is generally a good plan to do a biopsy on the fistulous margin to determine whether or not carcinoma cells are present, although many fistulas of this type are complications of radiotherapy rather than of the cancerous disease. Such accidents are of course far less common than they were in the early days of radium therapy.—Ed.)

ELECTROMETRIC STUDIES IN WOMEN WITH MALIGNANCY  
OF CERVIX UTERI

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Science, 105: 209-210, 1947

A preliminary report is presented of the relatively steady state voltage gradient between the symphysis pubis and the cervix uteri in women with malignant and

non-malignant disease of the genital tract. In a group of 13 cases of pathologically proved malignancy, all cases showed a marked negativity of the region of the cervix with respect to the symphysis. By contrast, 16 patients with non-malignancy showed, under the same conditions, an almost uniform positivity of considerable magnitude in the region of the cervix. There were 3 exceptions, explanations for which require further study.

(The results reported by this application of electrometric methods to the diagnosis of cervical cancer are at least provocative, especially as they represent the work of investigators well trained in electrometrics. I am sure, however, that the authors themselves withhold judgment as to its reliability and its possible practical application in clinical diagnosis.

Such studies serve to illustrate and emphasize the interdependence of all branches of science. Perhaps the most shining example in our own field has been the life-saving application of radium, a discovery of the physicists, the Curies. I understand that the principle of radar is being invoked in the study of some obstetric problems. Perhaps some day someone will devise a method of equipping the fetus with radar, so that it can avoid collision with the bony obstacles which so often make its journey through the pelvic channel difficult and hazardous.—Ed.)

## THE PRESENT STATUS OF ENDOCERVICITIS

C. PANETIERE

*Miami Beach, Florida*

South. M. J., 40: 183-186, 1947

The writer discusses the symptoms, etiology and treatment of endocervicitis. The outstanding manifestation of this disease is a vaginal discharge. Usually it is made up of cellular debris, leukocytes, some erythrocytes, mucus and a variety of organisms. The pyogenic type of organism predominates, with the occasional encounter of the anaerobic type. The presence of a discharge is important clinically because of associated complications, such as urinary infections, sterility, pruritis vulvae, or even malignancy.

There are 3 etiological factors believed to play an important role in the production of erosion or endocervicitis: (1) infection; (2) hormonal influences; and (3) abnormal anatomic position of the uterus. The bacteriologic aspects of the discharge are cited in support of the inflammatory nature of the disease. Some observers believe that in reality these inflammatory changes are produced by hormonal activity. In support of this theory, the author mentions those cases in which no infectious agent can be found clinically and in which an abundant discharge is present in spite of normal appearing epithelium. In cases where there is an extreme angulation of the cervix, it is conceivable that friction occurs between the cervix and the vaginal wall, sufficient to destroy the epithelial lining.

The author presents a method of treatment for endocervicitis and erosion



which employs a new agent, flumerin. Flumerin is chemically designated as a disodium salt of hydroxymercuri-fluorescein, and contains 30 to 32 per cent of mercury in organic combination. The author reports the treatment of more than 1000 cases over a 10-year period. With the speculum placed and the cervix exposed, the vault is irrigated with warm mercury cyanide and is dried with gauze. Any mucus plug is removed from the cervical canal. The entire area is then sprayed with tincture of merthiolate and finally a generous spraying of flumerin. Enough flumerin is left in the vault to saturate a small gauze tampon; this is removed in 24 hours. In the majority of cases the discharge diminishes or disappears after the first few treatments and epithelization soon begins. Local treatments are continued twice a week for an average of 3 weeks. No contraindication and no evidences of mercurial absorption have been detected. The method is used only in mild cases.

(Although I have had no experience with flumerin, it is difficult to work up any enthusiasm for any new clinical treatment of cervicitis. The results of more decisive methods of treatment, especially cervical electrocauterization or at times conization, are so much better and quicker than all the long drawn out chemical methods formerly employed that it is difficult to believe that they will be soon supplanted.—Ed.)

## THE DANGERS OF THE INTRACERVICAL PESSARY AS A CONTRACEPTIVE DEVICE

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*ASF Regional Hospital, Fort Jackson, S.C.*

*Am. J. Obst. & Gynec., 53: 684-687, 1947*

The authors present the cases of 3 patients treated within a 4-week period, who were suffering from varying degrees of pelvic inflammation initiated by a wishbone type of intracervical pessary which had been inserted to effect long-lasting contraception. All 3 of the women had emigrated to South Carolina from the same section of the United States within a few weeks of each other, suggesting both the ready availability of the intracervical pessary in that locale and the willingness of physicians to insert it. The writers emphasize that such devices are dangerous and should be withdrawn from the market.

Within 8 weeks after the introduction of the pessary, one of the women had developed severe endocervicitis, another suffered from acute parametritis complicated by infectious mononucleosis, and the third patient was critically ill from generalized peritonitis. All 3 patients recovered with treatment. In each case there was a history of menorrhagia and/or metrorrhagia, and 2 patients complained of leucorrhea.

It is concluded that the dangers inherent in such devices designed to give

more permanent contraception than is offered by the safer, though less permanent, means are too little appreciated by many physicians. 1 figure.

(The 3 cases reported by the author are illustrative of the hazards of intracervical pessaries as contraceptive devices, but they also serve to call attention to the complications, perhaps less frequent but nevertheless real, of intracervical stem pessaries when employed therapeutically for the relief of primary dysmenorrhea. Aside from more serious dangers, such pessaries frequently result in a troublesome cervicitis and leucorrhea, and their use has been abandoned by almost all gynecologists. There is all the more reason for this in the fact that cervical stenosis, formerly thought to be the prime cause of dysmenorrhea, is now thought to be of little importance in the production of this disorder.—Ed.)

## THE ADNEXA

### OVARIAN AGENESIS WITH DWARFISM

I. P. BRONSTEIN AND E. LOEFFLER

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*Am. J. Dis. Child.*, 73: 122, 1947

The authors discuss a syndrome occurring in adolescent girls which is characterized by dwarfism and genital retardation. Dr. Bronstein believes that the basis for this condition is some type of ovarian agenesis. The patients present pubic and/or axillary hair, for which the adrenal cortex may be responsible. One patient studied, a Negro dwarf who died of pneumonia, was found at autopsy to have a congenital defect of the ovaries. There was also hyperplasia of the hypophysis with eosinophilia. In this congenital ovarian defect, the epoophoron and the rete may be present. The general body type is female. The normal development of the rest of the genitalia is not due to gonadal influences, but is determined genetically. The dwarfism of such a person would be genetic and not hormonal. It is suggested that some damage to the genes of father or mother may cause aplasia or degeneration of sex cells and may also be responsible for reducing the genetic height of the subject.

(A number of studies have appeared in the past few years on the subject of the relatively rare syndrome associated with ovarian agenesis, notably those of Wilkins and Fleischmann. The arrest of development in these cases involves the ovary primarily, and not the pituitary, as in so-called pituitary infantilism. As might be expected, the cases of ovarian agenesis show an excess of pituitary gonadotrophes in the urine, while the primarily pituitary cases show a deficiency.—Ed.)

### DYSGERMINOMA AND PREGNANCY

H. SCHNEIDER AND M. VESELL

*New York, N. Y.*

*Am. J. Obst. & Gynec.*, 53: 688-691, 1947

While dysgerminoma is the most common tumor found in pseudohermaphrodites, Miller, Novak and Selye have verified the fact that dysgerminomas do not alter the hormonal or gonadal status of the female and have occurred with pregnancy. From the case reported in this paper and others mentioned, the authors state that the concept that dysgerminoma is chiefly associated with pseudohermaphroditism and hypoplasia of genitals is no longer tenable.

A 23 year old woman had been delivered of a living child by low forceps and episiotomy 2 years prior to her present admission. Two hours after delivery she had gone into shock and complained of severe abdominal pain. She recovered and was sent home on the tenth postpartum day. At that time a semisolid mass, 13 by 12 by 6 cm., was palpated in the region of the left ovary.

Her present pregnancy, 2 years later, was normal except for the presence of a freely movable mass in the left adnexal region. About 2 weeks before the expected date of confinement, this mass was found to be fixed in the pelvis and could not be dislodged. A cesarean section was performed, and a living child was delivered. At the same time a left salpingo-oöphorectomy was performed. On pathologic examination, the ovarian tumor proved to be a dysgerminoma. Vaginal examinations every 3 months for 9 months since operation have been essentially negative. 2 figures.

(It is interesting that not only dysgerminoma, but also granulosa cell tumor and arrhenoblastoma, have been found compatible with normal pregnancy. The earlier view was that dysgerminoma occurs rather characteristically in individuals who are definitely subnormal from a sexual standpoint, such as pseudohermaphrodites, or women with amenorrhea, hirsutism and poor breast development. As cases have accumulated over the years, it has developed that the great majority of women with dysgerminoma are essentially normal from the standpoint of sex development and function. It is therefore not surprising that in an occasional case such tumors, like more common tumor types, are encountered in association with pregnancy.—Ed.)

## CO-EXISTING DIFFERENT TUMORS OF THE OVARIES

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*Unity Hospital, Brooklyn, N. Y.*

*Am. J. Obst. & Gynec., 53: 700-703, 1947*

The authors present a case of co-existing different tumors of the ovaries, one a dermoid cyst and the other an endometrial cyst in a woman who previously had had a pilonidal cyst removed, in an attempt to enhance the theories of ectopic origins in pathologic entities such as these.

The patient, aged 35 years, para ii, complained of pains in both lower quadrants of the abdomen which were dull and steady since the birth of her first child 10 years prior to admission. The history was otherwise negative except for the removal of a pilonidal cyst 11 years previously. Examination revealed a lacerated, eroded and cystic cervix, tender on motion, and a retroverted, fixed and tender uterus. The adnexa were tender but not palpable.

At laparotomy a dermoid cyst of the right ovary and a chocolate cyst of the left ovary were removed. Endometrial implants in the posterior cul-de-sac were cauterized. The uterus was suspended. Microscopic sections of the

ovarian tumors proved the final diagnosis to be: follicular cyst; endometrial chocolate cyst; dermoid cyst with teratomatous tissue elements.

From observation of this case in which a dermoid cyst in one ovary and an endometrial cyst in the other ovary without generalized endometriosis were found in a woman previously operated upon for a pilonidal cyst, the authors contend that perhaps certain organs have an inherent ability to harbor embryonic rests and, when the organism reaches full maturity, these rests undergo metaplasia and appear clinically. 3 figures.

(All sorts of combinations of the common tumors of the ovaries may be encountered, and there would seem to be no reason why this should not be the case. Whether such an explanation as is suggested by the authors is of importance or not, or whether mere coincidence is sufficient to explain such co-existing tumors, it is difficult to say. Certainly it can scarcely be invoked in the authors' case of co-existing dermoid and endometrial cysts, since the latter are not neoplastic and are certainly not derived from embryonic rests in the sense that this term is used in the explanation of certain tumor forms.—Ed.)

## PERFORATING OVARIAN CYSTIC TERATOMAS: REPORT OF AN UNUSUAL CASE

G. H. LOWE, JR., C. F. DIXON AND M. C. PIPER

*Rochester, Minnesota*

Proc. Staff Meet., Mayo Clin., 22: 117-120, 1947

The writers report an unusual case in which an ovarian cystic teratoma communicated with the vagina and perforated the rectosigmoid. A previously healthy 23-year-old woman was delivered normally in June, 1943. Following delivery there appeared a low-grade fever which continued for 5 weeks when chills, lower abdominal cramping pains, diarrhea and vomiting developed. No pathologic conditions were found in the pelvis. The symptoms continued intermittently until October, 1943, when a large pelvic mass was found pushing the cervix markedly anteriorly. Diathermy was administered and the mass was reduced in size and became localized more on the left side.

In November the patient reported the presence of traces of feces in vaginal secretions. Diarrhea became marked. In January, 1944, a fistulous tract entering the vagina on the left posterior side was noted. Surgery was delayed to permit further localization of the process.

The patient reported in January, 1945, complaining of longstanding distress in the lower abdomen, rectal and pelvic fullness, some rectal bleeding and painful defecation. Rectal examination revealed a mass, 2 or 3 inches long, covered by mucus except where a possibly calcified mass protruded. Proctoscopic examination revealed a well-formed molar tooth on a gumlike structure protruding into the rectosigmoid.

Panhysterectomy with closure of a sigmoidodermoid fistula and sigmoido-vaginal fistula and transverse colostomy was performed. A right ovarian dermoid, 2 cm. in diameter, and a left ovarian dermoid, 7 by 6 by 4 cm., were found. The latter had perforated the rectosigmoid and was tightly adherent to the vagina. The right dermoid contained only a few hairs while the left dermoid contained 6 well-formed teeth mounted on a jawlike structure.

(This interesting case illustrates the possibility of secondary infection in ovarian cysts, sometimes by the hematogenous route, but in other cases, as in this, from proximity to the bowel. Dermoid cysts are thought to be more susceptible to such secondary infection than other cysts, presumably because of the chemically irritating nature of their content. One can imagine that a proctoscopist might get a bit of a shock to behold a set of vicious teeth grinning at him from the patient's recto-sigmoid wall. No case has as yet been reported of a teratomatous eye which winked at a perfectly sober proctologist.)

There is one other condition in which bony structures may be extruded from the rectum. I refer to the rare cases in which tubal pregnancy had occurred many years previously, without recognition or operation. The retained fetus may undergo lithopedion formation or mummification, and years later, as a result of secondary infection and abscess formation, may be expelled piecemeal through the rectum. Many years ago I saw a woman of about 60 who thus extruded a fetal scapula and some fetal long bones, the history revealing symptoms many years previously which indicated the probability of a ruptured tubal pregnancy at that time.—Ed.)

## UNUSUALLY LARGE OVARIAN CYST IN AN ELDERLY WOMAN

L. B. CLAY AND V. S. CABOT

*Minneapolis, Minnesota*

Minnesota Med., 30: 60-61, 1947

A 68-year-old woman was first seen with complaints of vertigo, fainting and indefinite gastric distress. On examination, the abdomen was symmetrically distended, the uterus pushed down deep into the pelvis and both vaginal vaults were shortened. A diagnosis of a cystic tumor arising in the pelvis and extending to the xiphoid process was made. Fifteen years previously, the patient had been told that she had an ovarian cyst the size of a grapefruit.

After the present examination, the patient refused hospitalization and was treated symptomatically at home for 3 years. The distention continued to increase, partial bowel obstruction developed, and she finally was hospitalized. At operation a large cystic tumor was found to fill the entire abdomen from pelvis to diaphragm. A large quantity of clear fluid was aspirated before its removal. The pedicle was attached to the right broad ligament. Recovery was uneventful.

When refilled with water, the cyst weighed 42 pounds. The pathologic report was "a multilocular cyst lined with a single layer of columnar epithelium. There is no evidence of gross or microscopic malignancy."

Two and one-half months later the patient became ill with fever and vomiting. Following the development of abdominal distention, a paracentesis was performed and the specimen showed metastatic carcinoma cells. Laparotomy revealed that the omentum and abdominal organs were studded with metastatic carcinomatous lesions. Death followed operation in a few days. It was the pathologist's opinion that the primary lesion was probably small and passed unobserved in the original cyst, as none could be found on postmortem examination. 2 figures.

(While this tumor was a large one, it cannot compare with some of the aristocratic giants of the ovarian cyst family. Lynch collected quite a group of these neoplastic behemoths weighing 200 lbs. or more in his monograph on Pelvic Neoplasms.

Whenever it is possible to remove a large cyst without rupture, even though the incision may have to be very long, this should be done. Even the cells of benign cystadenomas may occasionally implant themselves on the peritoneum, but, much more important, one can never be sure that malignant changes have not developed at some point in the wall of what may clinically seem to be a benign cystadenoma.

This is well illustrated in the authors' own case. The fact that omental and peritoneal recurrence of definitely carcinomatous nature occurred so soon after the operation makes it quite sure that carcinomatous areas were present in the original cyst. From the pathologist's standpoint, it is important to make many blocks of large cysts, but especially to include blocks from areas of nodular thickening or of very spongy or fungous appearance. —Ed.)

## PRIMARY CARCINOMA OF THE FALLOPIAN TUBE

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*Am. J. Obst. & Gynec., 53: 1049-1053, 1947*

The accepted incidence of primary carcinoma of the Fallopian tube is between 0.2 and 0.5 per cent of gynecologic malignancies; the age group is mainly in the fifth decade. The diagnosis is seldom made preoperatively and not always at the time of surgery. Over 95 per cent of the lesions are accounted for at microscopic examination. Seven cases have occurred at this hospital since 1924; in one a tentative preoperative diagnosis of tubal carcinoma was made. The latter case is described in detail and the remaining 6 are briefly discussed.

A 56-year-old white patient, para iv, gravida v, entered the hospital, having noted a yellowish to brown viscid vaginal discharge about one month previously. Two weeks following this the discharge was blood tinged for one day and she developed a dull aching pain in the lower back and left lower abdomen. The vaginal examination revealed a normal cervix and uterus. The right adnexa were considered normal on palpation. There was a soft, elongated, orange-sized mass adherent to the left adnexa. The ovary was not palpable as such.

Primary carcinoma of the Fallopian tube was diagnosed. At operation there was about 250 cc. of chocolate colored fluid free in the abdominal cavity. There was an elongated, soft, red-blue adherent mass 6 cm. in diameter involving the left tube. There was a right adherent tubo-ovarian inflammatory mass. The left ovary was normal. There were several small fibromyomas in the uterine wall; the cervix was normal. Complete hysterectomy and wide removal of the adnexae were done. When opened, the left tube revealed a papillary carcinoma tissue within the tubal wall. The right tube contained no evidence of carcinoma. The histologic diagnosis was primary carcinoma of the Fallopian tube. Post-operatively, deep pelvic x-ray therapy consisting of a total of 4,000 roentgen units was given. Four months after surgery, there was no palpable evidence of carcinoma.

The ages of the remaining 6 patients whose cases are briefly discussed were 59, 40, 58, 49, 60 and 48 years, respectively. Abdominal pain was the most frequent symptom, others being weight loss, abdominal enlargement, vaginal bleeding and discharge and other abdominal discomfort. At operation the uterus was normal in all but one case, in which it was studded with small nodules. One patient died 3 years after operation as a result of metastases.

The authors conclude that the history of postmenopausal serosanguineous discharge combined with the pelvic findings of an apparently normal uterus and cervix and a soft elongated mass in the adnexa are suggestive of primary carcinoma of the Fallopian tube, although a positive diagnosis cannot be made except on rare occasions. 3 figures.

(The clinical history of this patient is a typical one for carcinoma of the tube, and in the retrospect, the symptomatology of most cases of tubal carcinoma is fairly typical, and yet the finding of this lesion is generally a surprise simply because its rarity makes it likely not to be thought of. If it is considered at all, it is apt to be considered much less likely than ovarian carcinoma, in spite of the fact that most cancers of the ovary do not produce postmenopausal staining, so commonly seen with primary tubal carcinoma. It is also because of the lack of suspicion of this rare lesion that one is likely to omit salpingography or vaginal smear examinations, both of which might be helpful.—Ed.)

## CHRONIC SALPINGITIS

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*West. J. Surg., 55: 81-86, 1947*

The authors have reviewed the case histories of 3,242 patients admitted to the Los Angeles County General Hospital from 1940 to 1945 with the diagnosis of chronic salpingitis. They eliminated a large percentage of those records in which other pathological conditions were of major interest, and also cases with initial attacks of acute salpingitis for which treatment consisted mainly of



general and specific measures. A review of 1000 acute cases, divided about equally between those receiving sulfa drugs and those on general supportive measures, showed little difference in the time necessary to bring about relief of symptoms. The fact that the sulfa drugs were used in the more serious cases might modify this view. It is generally recognized that they are of value in initial attacks and also in acute exacerbations of chronic pus tubes and walled off abscesses. They are of great value when infectious material has been spilled within the abdomen, in 5 to 8 gram doses of crystals.

The writers have studied the preparation, operative management and results in 759 cases in which surgery was indicated. The great majority of these patients were from 20 to 40 years of age, and about 40 per cent had had abortions, many over 10 times. Only 73 patients had positive reactions in the 730 whose Wassermanns were recorded. Irregular bleeding was a major complaint in slightly over 25 per cent of cases.

Study of the white and differential counts with the accompanying sedimentation rates, is of great value in determining the optimum time for surgery, although a rapid sedimentation rate is not an absolute contraindication. Adequate preoperative care, with intravenous fluids or transfusions, and Wangenstein suction or Miller-Abbott regime in case of distention, are of prime importance for the success of major pelvic surgery.

The authors state that the uterus should be removed after double salpingectomy, unless it presents a smooth surface which can be used to cover dangerous raw areas. They believe that supravaginal hysterectomy, preceded by adequate cervical cautery, is preferable to complete removal of the uterus in cases of extensive pelvic inflammation. Cashman found only 2 cases of cancer occurring in nearly 4800 cervixes which had been adequately cauterized. In the present series, there were only 11 panhysterectomies as compared with 716 supravaginal hysterectomies. The authors performed 448 cervical cauteries.

The appendix was removed in 336 cases. It is recommended that this organ be removed, unless definitely innocuous, in all cases in which the surgical condition of the patient is satisfactory.

There were 21 operative complications in this series and 5 re-operations. A review of the 11 cases in which death occurred is presented.

(In spite of the striking improvement in the therapy of acute salpingitis which has occurred with the introduction of sulfa drugs and penicillin, there are still cases in which operation is necessary because of the sequelae of infection, whether gonorrheal or pyogenic. When bilateral salpingectomy is necessary in comparatively young women, it is usually better to conserve the uterus, and thereby the menstrual function, unless the organ is so extensively involved by adhesions as to constitute a bid for later trouble. While it is true that the menstrual function is not essential to good health, the fact remains that many women who are surgically deprived of this function cannot be persuaded that they are not partially defeminized.

Even if the uterine surface is raw and granular, it is often a good plan to preserve the menstrual function by amputating the uterus well above the internal os, thus conserving an annular zone of endometrium. In such cases the menstrual periods recur regularly, though usually very scant. In other cases an extensive fundectomy may serve the same purpose.

The fact that the authors did only 11 panhysterectomies as compared with 716 of the supravaginal variety leaves no doubt as to their preference. On this point many, now probably a majority of gynecologists, will disagree with them. On the other hand, in the frequently difficult inflammatory cases, with dense adhesions to the bowel, even the most ardent total hysterectomist would be smart to settle for a supravaginal operation and even this may at times be difficult. As has been so wisely said, "always" and "never" are two dangerous words. Certainly they are in the realm of surgery.—Ed.)

## TUBERCULOUS SALPINGITIS

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*Am. J. Surg., 73: 523-526, 1947*

The writer discusses the etiology, symptoms, diagnosis and treatment of tuberculous salpingitis. It is generally regarded probable that tuberculosis of the internal generative organs is secondary to an infection of similar etiology elsewhere in the body, the lungs being the commonest source. Only in those unusual cases limited to the vagina, cervix or vulva is it conceivable that the process may be a primary one. The Fallopian tubes are involved in almost every instance of genital tuberculosis; the uterus is involved in about 65 per cent; the ovaries in about 30 per cent; and the cervix in about 5 per cent of all cases. Tuberculous salpingitis is seen most often between the ages of 18 and 35.

The symptoms of pelvic tuberculosis are often bizarre. If the bacillary virulence is great and the host's resistance is low, there will result a rapid overwhelming toxemia. This is augmented by secondary pyogenic invasion of the multiple fistulas which develop between involved abdominal contents and the vagina, rectum, bladder and skin. Less severe infections may resemble malaria with recurring moderate fever, lassitude, anorexia and an absence of noteworthy abdominal or pelvic complaints.

A history of chronic menstrual irregularities in a barren woman with uterine hypoplasia, bilateral adnexal masses and a pulmonary tuberculosis focus is highly suggestive when making a diagnosis. Conversely, salpingectomy is frequently preformed for chronically infected tubes with no suspicion of a tuberculous lesion which is revealed only by microscopic sections.

Total removal of all infected tissue, when possible, affords the best chance for complete recovery. When the tubes are involved, complete bilateral salpingectomy with cornual excision to remove the interstitial portions of each tube is desirable. When evidence of oophoritis exists, the ovaries should be removed without compunction. Frequent mention has been made in the literature regarding the beneficial effects which attend laparotomy and the exposure of infected organs to atmospheric oxygen. The author presents a case which illustrates just what may be accomplished by this.

A 16-year-old girl consulted the author with the following history: Two

years previously she had become involved in a white slave ring and was forced to engage in extensive commercial prostitution. In Sept., 1942, she escaped and returned home where she reported to the local venereal disease clinic. Repeated Kahn tests were negative, but a dark-field examination indicated the presence of spirochete pallida. *Trichomonas vaginalis* was profusely evident in cervical specimens. A course of bismuth and mapharsen was administered. During this period and for the ensuing 6 months, the patient enjoyed excellent health.

In July, 1943, she experienced a sudden profuse metrorrhagia which lasted about 5 hours. It was succeeded by a fever of 103 degrees and slight nausea. She was hospitalized and a laparotomy was performed. On opening the peritoneum literally hundreds of miliary tubercles were visible on the exposed intestinal surfaces. The gross appearance seemed so hopeless that the incision was closed without drainage after insufflation of 100 per cent oxygen. No organs were removed. For about one month following operation, the patient was free from symptoms, following which there appeared a blueish, thin-walled tumefaction in the abdominal incision. This was surgically drained leaving a small discharging sinus. Nine months later she consulted the writer.

At this time she was 5 feet, 9 inches tall and weighed 142 pounds, her blood pressure was 114/68, pulse 86/min. and temperature 99.6 degrees F. Detailed examination of the lung fields revealed no pathologic signs. The previous operation left a broad infraumbilical midline cicatrix which contained a granulomatous discharging papule. Deep external abdominal palpation failed to elicit even mild subjective tenderness. The vagina and urethra appeared normal. The uterus was small and on each side there was an enlarged tubo-ovarian mass which merged indefinitely into the thickened broad ligament. The author advised reoperation and removal of the tract together with its internal communication, if possible.

At operation, the previous operative scar was excised, removing a block of tissue consisting of skin, fascia and necrotic rectus muscle and sinus tract. On opening the peritoneum there was remarkably little evidence of the extensive pathologic change observed 10 months previously. Aside from several filmy adhesions immediately subjacent to the incision, all positive findings involved the pelvic organs. After severing a broad rectouterine fibrinous band, the fundus and 2 large tubo-ovarian abscesses were easily delivered. The tract had 3 internal connections, one to each of the adnexal masses and a third to a small subperitoneal lymph gland in the vesicouterine space. The adnexal masses, the entire sinus tract and the infected gland were removed and peritonealization was performed.

Unexpectedly, regular menstrual periods were established 2 months post-operatively. The patient, now 18, weighs 178 pounds and enjoys excellent health. The pathological diagnosis of the removed tissue was tuberculosis salpingitis.

(In the majority of cases, tuberculosis reaches the tubes by the hematogenous route from a focus elsewhere, usually in the lungs. Not infrequently, however, the tubal tuber-

culosis is only a part, and sometimes a subordinate part, of a process involving the peritoneum and intestine. This is mentioned because it is often a determining point in the choice of treatment. The cases in which surgical treatment is usually chosen are those in which the tuberculous nature of the tubal disease is not known, and often not even suspected, before operation. For that matter, even at operation there may be no suspicion on this point, for there are often no serous tubercles to be seen, and the so-called "mail-pouch" appearance of the fimbriated end of the tube is by no means constant. As a matter of fact, the diagnosis in such cases is likely not to be made until the microscopic sections are available. The results of surgical treatment in such cases are in the main favorable.

On the other hand, when a patient has an active lung lesion, or when there is good evidence of a tuberculous peritonitis, with fever, sweats, loss of weight and other such symptoms, operation would be unwise, and the treatment should be along the general lines of any active tuberculous process, with the accent on rest, nutrition and heliotherapy. It is in such cases as this that x-ray therapy may have a very definite value. On the other hand, an ill-advised operation may make the lot of the patient much worse, especially because of the hazard of intestinal fistulas.

The line cannot always be sharply drawn in accordance with the two categories mentioned above, as intermediate pictures are encountered. For example, tuberculous peritonitis may be of the so-called ascitic variety, with tubercles scattered all over the peritoneum, including that of the tubes and pelvis generally, but with none of the extensive intestinal infiltration and agglutination so often seen in the fibroplastic variety. In cases of this ascitic variety, there is often a perfect simulation of ovarian cyst, because the ascites is so characteristically of the encysted type. And it is in this group in which simple exploration, with evacuation of the fluid, has so often been followed by cure, whether this is due to the admission into the abdomen of atmospheric air, or of diffuse sunlight, or what not, for there has been much speculation on this point.

One of the very first patients on whom I operated in my residency days was of this type, the peritoneum, visceral and parietal, being studded with innumerable tubercles. Twenty years later she consulted me because of a ventral hernia, and I had an opportunity of observing the disappearance of all evidence of her original tuberculous peritonitis, although a few tiny fibroid tubercles were still present. She had been clinically entirely free of symptoms.—Ed.)

## GENITAL TUBERCULOSIS WITH ATRESIA OF THE VAGINA AND AMENORRHEA

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*Am. J. Obst. & Gynec., 53: 695-699, 1947*

A 19 year old Negro woman complained that she had never menstruated. She was planning to marry and stated that her vagina was inadequate. She had had a malodorous, thick, yellow vaginal discharge for many years, but otherwise had felt well all her life. There was no family history of tuberculosis.

Physical examination revealed that body development was normal and female in type. The thyroid was enlarged. The chest was normal to auscultation and percussion. On pelvic examination the vaginal outlet admitted 2 fingers but

ended in a blind cul-de-sac and was about 3 cm. deep. It was thought that the patient had congenital atresia of the vagina without evidence of glandular disorder.

Construction of an artificial vagina was planned. On incising the vault, an easy plane of separation was found and a normal-sized vaginal canal was opened. Its walls were more like a raw membrane than loose connective tissue. On the anterior wall was a raw nubbin of tissue which had a short canal. This was dilated and curetted, and a plug was inserted to keep open the vagina. Microscopic examination of the curettings showed chronic granulomatous endocervicitis, probably tuberculosis.

Four days later the abdomen was opened and a small uterus, both tubes and the left ovary were removed. Both tubes were thickened and nodular. No other organ was adherent or nodular. Microscopic examination of the removed organs showed typical tubercles, epithelioid cells and Langhans giant cells in the left tube. Less frequent tubercles were found in the uterus. No endometrium could be found.

Eighteen days after panhysterectomy, examination of the vagina showed that the newly opened portion was surprisingly clean and smooth and was apparently covered with young epithelium. The vault closure was healing and remained well suspended. Biopsies showed squamous epithelium with fibroblasts and numerous capillaries. There were scattered lymphocytes, large mononuclear cells and Langhans giant cells, but no typical tubercles. The patient was discharged in good condition, and later reported satisfactory marital relations. The adequate portion of the vagina was 7 cm. deep and functioned well. Intravenous pyelograms and chest x-ray were negative.

This case represents an incidence of 2.47 per cent vaginal tuberculosis at University Hospitals, which is in accord with recent reports in the literature. The authors believe that the infection of the vagina was secondary. The rarity of vaginal tuberculosis may be explained by the resistance of the mature vaginal mucosa, and it would be reasonable to suppose that the infantile vagina would be more susceptible. It is believed that the complete amenorrhea was perhaps due to total obliteration of the endometrium. The fact that vaginal discharge and amenorrhea were the only symptoms illustrates the indolent and apparently benign course which genital tuberculosis frequently follows.

(An interesting feature of this rather unusual case was the fact that the newly opened vaginal canal apparently cleared up rather promptly and remained in satisfactory condition after the removal of the extensive tuberculous disease of the tubes and uterus. This may be taken as illustrating the characteristic downward transmission of tuberculosis from the primary focus in the tubes toward the vagina.—Ed.)

## FEMALE UROLOGY

### UROLOGICAL GYNECOLOGY

D. LAZARUS

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Urol. & Cutan. Rev., 51: 74-75, 1947

In this paper the author stresses that the gynecologist should be acquainted with urological symptoms and methods of ascertaining the condition, and should work in conjunction with the urologist when and if the occasion arises.

In cases of urethral infection, should infection spread and involve the bladder, it becomes the province of the urologist; should it spread and involve the vagina and cervix, the condition becomes the care of the gynecologist. Cystitis, diverticula and tumors of the bladder go to the urologist, while cystoceles and urethroceles should be treated by the gynecologist. In spite of this delineation for certain groups of maladies, the gynecologist sees more patients with urological complications than the urologist sees of a gynecological type.

In laparotomies for gynecological causes, the proximity of the ureters to the generative organs may bring about injuries of the ureters. The author feels that the introduction of ureteral catheters prior to operation is unnecessary, and would avoid irritation and injury of the ureter and its subsequent infection.

There are many gynecological disorders that cause urinary symptoms. Among these are uterine fibroids, ovarian tumors or diseases and uterine displacements. On the other hand, a patient may consult a gynecologist for backache which is caused by pyelonephritis, horseshoe kidney or a calculus, or a patient may complain of right-sided pain or dullness preceding or during the menses which is caused by ureteral calculus, stenosis of the ureter or even ureteral spasm. Leucorrhea may be a symptom associated with urinary diseases. That gynecological and urological conditions may be coincidental or concomitant is of prime importance in studying the patient and referring her to the specialty of the condition of prime importance.

(The author does well to call attention to the frequent co-existence and often interdependence of gynecological and female urological conditions. In some clinics, as in our own, female urology is an integral part of gynecology. This is rather natural, since it was Dr. Howard A. Kelly, the first professor of gynecology, who was chiefly responsible for the development of female urology in this country. In perhaps the majority of clinics the treatment of female urological lesions is relegated to the urologists. No criticism can be made of either plan, so long as there is full and intelligent recognition of the close relationships involved. I agree with the author that the gynecologist sees many more patients with urological complications than the urologist sees of those in his field with gynecological complications.—Ed.)

## PODOPHYLLIN TREATMENT OF SOFT PAPILLOMAS OF THE FEMALE URETHRA

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Am. J. Obst. &amp; Gynec., 53: 658-662, 1947

The excellent results obtained in the treatment of the condylomata acuminata (venereal warts) with podophyllin by other workers prompted the authors to apply its use in the treatment of this condition in the female, with special reference to 8 cases of condylomatous masses of the urethra—better known as urethral papillomas.

The pathologic pictures of papilloma of the female urethra and condylomata acuminata may be considered one and the same. The term papilloma has often and preferably been used when condylomata acuminata are found in locales such as the urethra, anus and face. Novak and Taussig have shown that gonorrheal infection has no scientific correlation to the condylomata. Rather, local and chronic irritation are believed the etiologic factors. Condylomata acuminata are usually small, discrete, pointed, soft, pinkish-red excrescences tending toward clusters and varying from 1 mm. to orange-sized or larger. The microscopic picture shows a thickened but normal epithelial layer with treelike pattern hypertrophy of the papillary layer. Chronic inflammation of the stroma containing lymphocytes and plasma cells is practically always present.

The method of treatment used in this study consisted of applying podophyllin ointment (25 per cent) in a hydrosorb base to the surface, sides, cracks and crevices of the lesions. The adjacent normal skin is protected by either Lassar's paste, collodion or an anesthetic ointment. The patient remains in lithotomy position for 20 or 30 minutes after application of the ointment. The medication is washed off after 3 to 6 hours. During the next 12 hours marked local inflammatory and edematous reaction occurs. On the second to fifth day the lesions usually shrivel and drop off.

The authors have treated 8 cases of papilloma of the urethra in the manner described. Complete disappearance resulted in these cases. Two patients required 3 treatments, respectively, at weekly intervals; the remaining 6 required only one treatment. Three case histories are presented.

(It is true that many urethral caruncles have a histological structure quite like that of condyloma acuminatum. This applies to the common papillomatous variety, but not to the less common granulomatous. The results reported in the 8 cases of the series were apparently good, and the method seems worthy of further trial. However, in view of the marked local reaction often produced by podophyllin in the treatment of condylomata acuminata of even the skin surface, one would think that such treatment would cause far more disagreeable reactions on the delicate mucosa of the periurethral area.—Ed.)

## THE PATHOLOGY OF URETHRITIS AND ALLIED CONDITIONS IN THE FEMALE

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Urol. &amp; Cutan. Rev., 51: 23-24, 1947

The writer attempts to present the clinico-pathologic picture of the common lesions of the female urethra. The patient with urinary symptoms seeking relief from her misery deserves a careful examination which should begin at the meatus.

The most common lesion of the female urethra is urethritis. In simple non-specific urethritis, the urethral mucosa presents an increased vascularity throughout its length, particularly in the region of the external sphincter. Edema is evidenced by increase in the longitudinal folds and the pinkish color is replaced by a confluent redness. The appearance resembles that resulting from a chemical burn to a mucosa. There is no "beefsteak" or granulation tissue appearance at this stage.

Granular urethritis or chronic urethritis results from long continued or repeated simple urethritis. The meatus is more tightly closed, and may present cart-wheel spokes of contracture. Palpation of the urethra against the symphysis discloses tenderness and an indurated firmness. The surface of the mucosa is rough or granular, no longer in longitudinal folds. Pedunculated projections from the mucosa are frequently seen. There are also areas of contracture or actual stricture formation. Sphincter spasm is the rule. Cystitis may or may not be evident, but there is increased vascularity of the trigone in all instances.

Chronic atrophic urethritis is a type of urethritis which is commonly included under urethral stricture. Pathologically it is of cicatricial nature, but clinically, the manifestations of frequency, dysuria and nocturia would lead one to classify it as an urethritis. The urethra is found to be narrowed. Pale polypoid projections may be found throughout the proximal half of the canal, and they seldom contain the cystic fluid of granular urethritis. Dilatation of the urethra affords relief of symptoms, but it must be slowly carried out.

Urethral stricture in the female is a common finding. Since the size of the urethra varies (22Fr. to 34Fr.) over a fairly wide range, with an average calibration of 26Fr., no single caliber can be arbitrarily set as the limit of normal. Therefore, it is necessary to calibrate repeatedly the size of the urethra if one is to determine the normal for that individual. Urethral strictures are either congenital or acquired, the acquired strictures usually following a urethritis.

Urethral caruncle is usually preceded by either a urethritis, a stricture or both. Urethral caruncles are of 3 varieties, the first being the most common: (a) granuloma; (b) papillary angioma; and (c) telangiectatic mucoid polyps. Granulomatous caruncles are hyperplastic granulations at or near the meatus and are a part of a granular urethritis. Nervousness, irritability, referred pain in the



back, thigh, etc., are prominent symptoms in addition to the local symptoms of urgency, dysuria and frequency. They appear as sessile, red, granular proliferations of mucosa varying from 2 to 3 mm. in diameter to one cm. or more. Angiomata and mucoid polyps at the meatus give rise to fewer symptoms; and, as their names imply, they are pedunculated in form, usually protrude from the meatus and are more easily detected on inspection of the urethra.

(Urethral stricture is easily and frequently overlooked. Its treatment is usually simple, consisting of dilatation with graduated olive-pointed dilators of the Hegar type. I do not believe that urethral caruncle is usually preceded by a urethritis, or stricture, or both, as the author states. Certainly it is probable that the granulomatous type of caruncle is of inflammatory origin, but I know of no evidence, or of any good reason, to invoke such a sequence with the papillomatous or telangiectatic varieties.—Ed.)

## PELVIC ABSCESS AND ITS RELATION TO UROLOGICAL CONDITIONS

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*Urol. & Cutan. Rev.*, 51: 78-80, 1947

Since the primary cause of all kidney infections seems to be the presence of an obstructive syndrome, high or low in the urinary tract, it can readily be seen that a pelvic abscess formation is a logical cause, and the final clinical findings in many of these patients bears out this fact. The bladder, ureters and kidneys may all be involved in the obstructive and infective vise of a large multiple abscess of the pelvis. The treatment of these cases does not consist of primary treatment of the urinary findings, but the early diagnosis and treatment of the pelvic pathology, then later the correction of the urological symptoms.

A case is presented which illustrates the not too common picture of pelvic abscess and its association with renal pathology. The errors that can and have been made in differential diagnosis are set forth. Pelvic examination, rectal examination and x-ray with barium enema are of greatest importance in the differential diagnosis, although x-ray diagnosis may frequently be misleading and suggest malignancy instead of an abscess, giving rise to surgical intervention at a time when the abscess may not be properly walled off. In the present case, a 40-year-old woman was admitted after 21 days of illness with weakness, nausea, abdominal pain and distention, frequency of urination and a thick, purulent vaginal discharge with slight bleeding for 4 days before entry. Examination revealed marked distention, pain to deep pressure over the entire abdomen, fast pulse and a large mass felt on pelvic examination in the region of the left adnexa. X-ray study suggested possible carcinoma involving the recto-sigmoid colon. Laparotomy was performed, but due to a complete frozen pelvis, at-

tempts to separate intestine or omentum were unsuccessful and the abdomen was closed. The patient expired on the following day. The anatomical diagnosis included: tubo-ovarian abscesses, bilateral and of posterior cul-de-sac; perforation of lower sigmoid with partial obstruction; perforation of lower vagina; and multiple scars of both kidneys with obstructive changes to kidneys, ureters and bladder.

(While it is easy to see that urinary tract damage could be associated with such extensive pathology as is described in this report, I am frank to say that I have not been impressed with its frequency in the ordinary types of pelvic abscess, such as occur with gonorrhea. These are ordinarily of comparatively short duration, and easily relieved by vaginal puncture, and one would scarcely expect any urological complications in most such cases. The terminal symptoms presented by Hussong's patient, as well as the intestinal perforation and obstruction found at autopsy, would lead one to think that peritonitis was the cause of death, although it is not included in the anatomical diagnosis.—Ed.)

## AN EVALUATION OF THE CRITERIA OF DIAGNOSIS AND CURE OF GONORRHEA IN THE FEMALE

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*Am. J. Obst. & Gynec.*, 53: 829-833, 1947

The material for this study consists of 598 cases of gonorrhea in the adult female from the Cincinnati Health Department clinic and from the Quarantine Hospital of the Municipal Workhouse, on whom over 6,100 smears and 3,200 cultures were reported.

A single smear missed 59 per cent and a single culture, 38 per cent of the infected cases, but 3 smears and 3 cultures missed only 0.2 per cent. As a criterion for cure, 3 smears and 3 cultures in the 10 days after treatment missed 8 per cent of the treatment failures. The culture proved 1.7 times as accurate as the smear for diagnosis but no more accurate than the smear for detection of treatment failures.

False negative laboratory reports are due to (a) some biologic factor of which little is known, (b) the technique in taking specimens, and (c) laboratory errors. In the case of smears, these are most commonly the result of insufficient study of the slide, and in the case of cultures are due to the delicacy of the organism and its need for special handling. False positive results may be socially disastrous. They are found rarely with a properly performed culture.

In vulvovaginitis, of which 97 putative cases were studied, the smear proved of little value because of the high percentage of false positive reports. Cultures, including sugar differentiation, should be the sole method of diagnosis.

In adult females both smears and cultures should be used, as the accuracy of

diagnosis is increased significantly. The smear offers an opportunity for a rapid report if it is positive. The culture technique presents some difficulty for other than institutional practice, but it is feasible under most circumstances.

The author suggests that stricter and more uniform criteria for the diagnosis and determination of cure of gonorrhea in the adult female should be established by professional agreement. The minimum proposed to rule out gonorrhea is 3 smears and cultures, and to determine a cure, a succession of smears and cultures over a period of 2 months.

(This worthwhile study indicates that there are still pitfalls in the diagnosis of gonorrhea in the female, and the suggestions made by the author are sound. While it is now generally agreed that cultures are of much more decisive value than smears, he shows that single cultures are far from infallible, and that they must often be repeated. There is no doubt that many errors are made in attributing vaginal discharges in children to gonorrheal infection, and it is a comfort to have the fortification of a positive culture in making such a diagnosis. In adult cases this likewise applies, especially as social disasters may be the result of diagnostic errors, as the author states.—Ed.)

## THE PENICILLIN TREATMENT OF GONORRHEA IN THE FEMALE A STUDY OF THE TIME-DOSE RATIO

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Ohio State M. J., 43: 369-371, 1947

A series of 252 women with bacteriologically diagnosed gonorrhea was treated with penicillin by 3 distinct dosage programs in an effort to find an effective schedule convenient for the out-patient management of this disease. The dosage forms were as follows: Schedule A consisted of 100,000 O.U. given in 5 injections of 20,000 O.U. each at 2-hour intervals, with a total elapsed time of 8 hours during which the patient was required to remain close to the treatment center. Schedule B consisted of the same schedule but double the amount of penicillin, i.e., a total dose of 200,000 O.U. given at 5 injections of 40,000 O.U. each. Schedule C consisted of 3 injections at 2-hour intervals. The first injection of 100,000 O.U. (50,000 units into each buttock) was followed by two 50,000 O.U. injections at 2-hour intervals. The total dosage was the same as in Schedule B, but the elapsed time was only 4 hours.

The 252 patients received a total of 314 courses of treatment, of which 7 were sulfathiazole (1 gram 4 times a day for 5 days). Two courses of 300,000 O.U. were given, and one of 250,000 O.U. The remaining 304 courses of treatment were divided as follows: Schedule A, 94; Schedule B, 50; Schedule C, 160.

With the class of patients under consideration, the exposure rate is high, and the question of reinfection versus therapeutic failure has been perplexing. Post-treatment smears and cultures were required at weekly intervals for 5 weeks,

aiming at a goal of 5 consecutive negative smears and cultures. Nevertheless, the authors have acknowledged that a patient with 3 negative reports who turns positive 4 or 5 weeks after penicillin is undoubtedly a reinfection. A positive obtained within one or 2 weeks after treatment was charged as a therapeutic failure.

Of 94 courses of therapy given by Schedule A, 86 (90.7 per cent) were successful. The 8 failures all cleared up on subsequent courses of treatment. Of 50 courses by Schedule B, 45 (90 per cent) were successful. The 5 failures were treated either by repetition of penicillin or by another form of therapy. Of 160 courses of treatment by Schedule C, 129 (80.7 per cent) were successful. More than half of the 31 failures occurred on the first post-treatment smear and culture. Of the 7 courses of sulfathiazole, which were prescribed when one or more courses of penicillin failed, 5 were productive of cures.

From this study it was thus found that the shortening of the time schedule from 8 to 4 hours resulted in a loss of almost 10 per cent of effectiveness, even though the dosage remained constant (200,000 O.U.). Accordingly, the authors have recently adopted (Schedule D) 300,000 O.U. as the total dose of sodium penicillin and are administering benzoic acid by mouth with the injections of the antibiotic.

Although patients apparently refractive to penicillin therapy have been encountered, the writers have not found any strain of penicillin-resistant gonococcus on subculture of the isolated organism to penicillin impregnated culture media.

(This is a very worthwhile study of various plans of penicillin therapy in gonorrhea. This antibiotic has established itself as the drug *par excellence* in the treatment of gonorrhea, but there is still much diversity of opinion as to the time-dose ratio in its administration. The studies of the authors indicate that at least some sacrifice of effectiveness is incurred if the time schedule is cut down unduly. The total dosage of 300,000 O.U. is larger than is recommended by some, but is probably wise, especially in view of the harmlessness of even much larger dosage. The factor of penicillin-resistant strains of the gonococcus, which was a sort of bugaboo in the early days of penicillin therapy, is minimized by the authors, as it has been in most recent studies of the subject.—Ed.)

## OPERATION FOR THE CURE OF INCONTINENCE OF URINE IN THE FEMALE

R. T. FRANK

New York, N. Y.

Am. J. Obst. & Gynec., 53: 618-626, 1947

The author presents an operative technique for the treatment of incontinence of urine, with emphasis on the exposure and utilization of 3 fascial structures—fascia propria vesicae, pubocervical fascia, and triangular ligament.

A median vertical incision is made through the anterior vaginal wall. The endovesical fascia and fascia propria of the vagina are peeled away from the vaginal mucosa in one layer, and the bladder is freed and mobilized from the cervix and lower uterine segment. It may then be seen that the fascia propria of the bladder is defective at the bladder neck. By placing interrupted sutures of fine chromic gut which are started at least 5 cm. below the vesical neck and proceeding upward, a "V" shaped collar is formed at the urethrovesical junction, tight enough to indent the urethral tube slightly.

The endopelvic fascia (pubocervical) is then approximated from below upward. The lowest 2 sutures tack the fascia to the anterior surface of the cervix, permanently elevating the bladder. The higher ones overlap the fascia in front of the bladder. The topmost suture brings together the fascia in a "V" shaped sling which is slightly higher up than that formed by the fascia propria.

The tissues lateral to the urethra beneath the pubic bones are grasped with a blunt hemostat on each side. These tissues are what remains of the triangular ligament. Two chromic sutures are passed uniting the structures snugly in front of the urethrovesical neck. The operation is concluded by resecting the vaginal edges, if necessary, and closing the vaginal wound with interrupted sutures.

The author has used this technique for years, with satisfactory results for both stress and complete incontinence. Of 19 patients upon whom the operation was performed in the last 10 years, 4 had had from one to 3 previous plastic operations without cure. Two of these were cured, and 2 were 75 per cent improved. Of the 15 remaining cases, 12 were cured, 2 were 95 per cent cured, and one was unimproved (aged 70 years). A few of the case histories are briefly described. 5 figures.

## GYNECOLOGICAL OPERATIONS IN THE TREATMENT OF STRESS INCONTINENCE OF URINE

A. PHILIP

*New York City, N. Y.*

*Urol. & Cutan. Rev., 51: 80-81, 1947*

The author describes 2 cases in which gynecological conditions were complicated by urinary disturbances, where different operations yielded equally good results. Individualization is necessary to select and apply the different operative methods, which should be planned preoperatively and modified according to the individual case.

The first patient, a 32-year-old para i, developed descensus of the vagina and uterine retroversion shortly after confinement. Ring therapy was instituted,

but the large cystocele, urethrocele and vaginal descensus progressed until there occurred stress incontinence and varicosities of both legs. Uterine fibroids increased in size. Operation was performed essentially in accordance with the following preoperative plan:

I. Vaginal operation:

- a. Dilatation and curettage,
- b. Modified anterior vaginal plastic,
- c. Colpoperinorrhaphy,

II. Laparotomy:

- a. High amputation of fibroid uterus,
- b. Fixation of stump to abdominal wall,
- c. Appendectomy (history of chronic appendicitis),
- d. Meig's operation; longitudinal strip of rectal fascia transplantation below bladder neck.

The patient recovered uneventfully and, after some initial adjustment, is now without complaints.

The second patient was 72 years old, had had 3 children, and for many years had had incontinence of urine which had developed from stress incontinence into a steady dripping. Examination revealed a cystocele, urethrocele and lacerated perineum. An extensive vaginal plastic operation was performed under local anesthesia. Careful, extensive dissection was applied; 2 purse-string sutures reduced the cystocele; Kelly stitches were applied to strengthen the vesical neck and the sphincteric region; and vertical U sutures were used to strengthen the fascial bladder supports. Transplantation of the bulbocavernosus pedicle below the bladder neck was performed. Colpoperinorrhaphy followed. The wound healed by secondary union and estrogen therapy. The patient is now without complaint.

(The first case illustrates an association of conditions which is not treated in the same way by all gynecologists. If, in a case of large cystocele and rectocele, hysterectomy is at the same time desirable because of small myomas or for any other reason, the ideal plan is hysterectomy by the vaginal route, with also correction of the cystocele and rectocele. Where the myoma is too large, or where fixation of the uterus makes its vaginal removal difficult or hazardous, the problem is not so easy. In most such cases the vaginal work can be done first, including usually amputation of the cervix, and correction of the cystocele and rectocele. The Manchester procedure of bringing the cardinal ligaments together anterior to the uterus is usually done, making unnecessary suspension of the cervical stump to the anterior abdominal wall, as the author advocates. It is true that the abdominal hysterectomy may be a little more difficult than usual after the above described vaginal procedure, but it can ordinarily be readily accomplished.)

As for the stress incontinence so often seen with large cystourethrocele, all but a comparatively small proportion of cases can be relieved by combining with the Watkins-Manchester types of operation some such procedure as the Kennedy type of operation. Where the bladder neck is baggy and prolapsed, the Kelly operation of vesical plication gives additional assurance of correcting the incontinence.—Ed.)

## OPERATIVE GYNECOLOGY

### A NEW OPERATION FOR STERILITY CAUSED BY ACUTE ANTE-FLEXION OF THE CERVIX: REPORT OF A CASE

R. CRONSON

*New Rochelle, N. Y.*

M. Rec., 160: 36-37, 1947

Mrs. B.B., of childbearing age and married over 3 years, consulted the author because of sterility, the cause of which was found to be an acute ante-flexion of the cervix; there was no other pathology. To correct the position of the cervix, to relieve the pressure of the uterus on the cervical canal and enlarge its diameter, and to prevent a recurrence of the flexion, the author devised the following operation:

The cervix is split into an anterior and posterior flap, about  $\frac{1}{2}$  inch of the estimated internal os. The anterior flap is given  $\frac{1}{16}$  inch more tissue, causing the cervix to lie in a more natural position. A wedge-shaped mass of muscle tissue is then removed from the cut sides of each flap with the base looking externally, including the angles between the flaps. This enlarges the diameter of the cervical canal. The mucosa is removed about  $\frac{1}{16}$  inch from the borders of the anterior and posterior flaps, giving broader surfaces for adhesion purposes. A suture is passed at the angles between the flaps, from the vaginal mucosa beneath the cervical mucosa, through both cervical and vaginal mucosa, and then tied. Similar sutures are passed downward. The posterior flap is cut about  $\frac{3}{8}$  inch from the estimated internal os and  $\frac{1}{8}$  inch from the anterior flap. This prevents flexion of the cervix and allows more tissue to the anterior flap. The 4 corners of the flaps are rounded out and wedge-shaped masses of muscle tissue and mucosa are removed from the borders for about  $\frac{1}{16}$  inch, as previously mentioned. The suturing is completed as above.

Following this operation, the author's patient gave birth to 2 children.

(The author apparently still believes that ante-flexion is a cause of dysmenorrhea, because of the obstruction produced by the kink in the canal. This idea was rather generally abandoned about a quarter of a century ago, and for very good reasons. Most women with dysmenorrhea have no angulation or obstruction of the canal. More than 30 years ago I studied a group of dysmenorrheic women at the height of their pain, and found that a uterine sound could be easily passed into the canal. Conversely, even very sharp ante-flexion is often seen in women who have no menstrual pain whatsoever. It is strange that this old concept has been again brought forward by the author, and even more remarkable that he harks back to the dark past to resurrect such a cervical plastic procedure as he describes, and which is only a slight variant of the Dudley and Pozzi cervical dissection operations of the preceding generation. It is hoped that no one will join the author of this paper in a revival of these unlamented procedures.—Ed.)

## STERILITY

### THE PROBLEM OF STERILITY: ITS INVESTIGATION AND TREATMENT

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Practitioner, 158: 279-288, 1947

Routine examination of the infertile couple should include an inquiry regarding habits of life and a search to eliminate any possible source of intoxication and infection. Any factor that lowers the state of health of the individual may lessen fertility. Inquiry should be made regarding the normality of sex relations and physical causes must be excluded, such as hypospadias, phimosis, and undescended testicles in the male, and an intact hymen, a cervical polyp, and genital hypoplasia in the female. Uterine retroversion is seldom a cause of sterility. Examination should also exclude the existence of stigmata of endocrine disorders.

Investigation of the male can be properly assessed only by a complete semen analysis. A standard method of examination has been suggested by Harvey and Jackson (1945), and Table I was compiled by them.

It is not suggested that fertilization cannot occur with semen that falls below this standard, but if a man with semen below standard is married to a highly fertile woman, the chances of conception are much greater than if he were married to a woman of low fertility. Hence the importance of bringing about even minor improvement in spermatogenesis.

A high percentage of males are subfecund. In a series of 1356 cases, 11.4 per cent showed azoöspemia, and 16.5 per cent marked oligozoöspemia. According to American writers the semen of 60 per cent of men falls below an approved standard. In the majority of cases there is no apparent predisposing cause for defective spermatogenesis, and to this condition the term "congenital aplasia" has been applied. Suggested causes are hereditary deterioration of poor stock, dietary deficiencies of the mother during fetal development or of the adolescent male, or the unnatural concomitants of modern social conditions.

In discussing investigation of female fecundity, the author first considers the occurrence of ovulation. Rubenstein first drew attention to the biphasic character of the early morning rectal temperature in women; the temperature remains at a lower level during the pre-ovulatory phase than during the post-ovulatory phase. The rise of temperature at the initiation of the second phase indicates the occurrence of ovulation, and only rarely does the temperature fail to correspond with endometrial biopsy. The most common cause of lack of ovulation is genital hypoplasia, which may be considered analagous to congenital aplasia in the male. Genital hypoplasia may be suggested if there is a history of de-



layed onset of menstruation, scanty or infrequent menses, severe functional dysmenorrhea and sexual frigidity. Often the vagina narrows at the upper end, the cervix is long, hard and conical or short and button-like and the fornices are shallow. The uterus is hard, markedly ante- or retroverted and passage of a sound reveals an abnormal ratio of cervix to fundus. Some of these cases respond to endocrine therapy if it is taken early in adult life.

Endometrial biopsy will indicate whether or not ovulation has occurred if it is taken during the week preceding menstruation. The premenstrual estimation of pregnandiol in the urine provides the best indication of luteal function.

There are 2 methods of investigating tubal patency, one by utero-tubal insufflation (Rubin) and the other by the injection of a radio-opaque oil into the uterus and tubes. An insufflator with kymograph attached is recommended; this enables the exact pressure at which tubal patency is obtained to be ascertained and depicts fluctuations representing peristaltic movements of the tubes.

TABLE I

Density	50 million/cc.							
Morphology	65 per cent normal							
	Age at start of incubation (hr)							
	$\frac{1}{2}$	1	2	3	4	5	6	7
Basic motility (percentage fully active after 1 hr at 37 C.....)	50	45	35	27	21	17	13	10
	Age at start of incubation (hr)							
	$\frac{1}{2}$	$\frac{1}{2}$ -3		3-5		5-7		
Viability ratio.....	1.5	1.25		1.0		0.75		

When insufflating the normal tube, a pressure of 40, 60, 80 to 100 mm. Hg. is required to overcome resistance at the isthmial end of the tube. At this point the recording needle drops slightly and fluctuations are recorded on the kymograph. Sixty to 100 cc. of carbon dioxide is sufficient to obtain an accurate reading. Abdominal auscultation permits hearing of intermittent escape of gas coincident with tubal contractions. Following normal patency, the patient experiences pain referred to the shoulder.

Stenosis of the tubes is indicated by a rise of the recording needle to more than usual pressure, a gradual fall or continuance in a straight line and absence of fluctuations. Auscultation reveals a continuous bubbling sound which indicates that the tube is acting as a conductor and has lost its power of contractility.

Occlusion is evidenced by a rise of the recording needle to the maximum pressure of 220 mm. Hg., at which point the gas requires to be turned off. Spasm at the utero-tubal junction may lead to an erroneous diagnosis of organic occlusion if reliance is placed on one test by one method.

In obtaining a salpingogram, as a rule, 6 cc. of oil is sufficient. It is advisable

to take a second film within a few hours or 24 hours after the first to ascertain whether peritoneal smearing with opaque oil has occurred. A stenosed tube is indicated by narrowing of the lumen, frequently along the whole course of the tube. Tuberculous disease is indicated by beading, irregular filling of the tube, and sometimes by oleosalpinx. The writer discusses the immediate and late complications of hysterosalpingography.

It is known that the cervix undergoes cyclical changes. During the ovulatory phase the cervical secretion increases in amount and when the cervix is viewed through a speculum a cascade of mucus can be seen hanging from the os. The post-coital cervical test provides a means of studying the cervical secretion and presence or absence of spermatozoa in the mucus. The incompatibility of cervical mucus and spermatozoa can be demonstrated by the invasion test (Kurzrok and Miller, 1928; Barton and Weisner, 1945).

The object of treatment of infertile marriages is to remove as many infertility factors as possible. Both husband and wife should be investigated simultaneously. The general health of both partners should be improved by diet, outdoor exercise and eradication of all foci of infection. The couple must be instructed regarding the fertile phase in the menstrual cycle and the frequency of intercourse. In a 28-day cycle the fertile phase lies between the tenth and sixteenth day, and intercourse can be planned to take place every second or third day of this period.

The author is convinced that hormonal therapy for the male may prove helpful. Many cases of testicular deficiency, of diminished libido and partial impotence may improve with small daily doses of methyl testosterone. The obese male of "pituitary" type often responds to gonadotrophic hormone therapy. A certain level of thyroid function is essential to testicular efficiency, and thyroid medication in small doses may be helpful even in the absence of evidence of subthyroidism. In a few cases, plastic surgery has been successful when azoöspemia was due to blockage of the vas deferens.

In the female, endocrine treatment to ensure ovulation is often given indiscriminately and without success. In non-ovulating women a course of mixed gonadotrophic hormones may incite regular ovulation. In women who ovulate irregularly, injection of the follicle-stimulating hormone at the mid-menstrual phase may stimulate ovulation. Irradiation of the pituitary gland with x-rays sometimes succeeds when the above treatment fails.

In cases of tubal occlusion, repeated insufflation may restore tubal patency. Better results are often obtained following a course of pelvic short-wave therapy and estrogens, the latter given during the follicular phase of the menstrual cycle. Isthmial occlusion of the tubes from organic causes rarely repays treatment of any form.

A vaginal discharge which results from infection should be given appropriate treatment. Cervical infections should be treated; many of these cases respond to a course of systemic sulfonamides, 1 gm. 3 times daily for 7 to 10 days. Limited cauterization and cervical repair may be required. Douching with Ringer's solution sometimes appears to aid conception.

Few cases of retroversion justify operative correction in the nulliparous

woman. Operation may be indicated when there is such forward displacement of the os that spermatozoa fail to enter or when, on performing a salpingogram, the injected medium can be introduced only after correction of malposition. Operation must not be performed when malposition is a stigma of hypoplasia.

As to other gynecological procedures, pregnancy sometimes follows myomectomy, although the fibroids have not caused tubal occlusion. Success often appears to follow dilatation of the cervix.

In certain cases small doses of estrogens during the follicular phase and luteal hormone during the progestational phase of the cycle assist conception. As in the male, small doses of thyroid assist function of the reproductive glands. In the case of the obese patient, the author prefers efforts directed towards reducing the patient's weight by diet and medication before resorting to administration of glandular products, with the possible exception of thyroid.

Statistics show that approximately 30 per cent of males of sterile couples are subfecund; in 50 per cent of these the cause is given as congenital aplasia of the testicles. About 30 per cent of sterile women possess occluded or partially occluded tubes, and in only a small percentage can a cause be elicited. The percentage of sterile women suffering from genital hypoplasia varies between 10 and 30 per cent. The writer is in agreement with Sharman (1944) that the majority of women with tubal occlusion, in whom no provoking cause can be ascertained, suffer from subclinical tuberculosis. In the majority of cases which she has operated upon for plastic reconstruction of occluded Fallopian tubes, tuberculous infection has been discovered microscopically. As for congenital under-development, it is suggested that much might be learned from a study of persons of primitive races.

(This is an excellent summary of the problem of sterility. Only one or two points need be commented upon. The author draws a comparison between what she calls "congenital aplasia" in the male as an important factor of sterility and a "congenital aplasia" in the female, equally important in lowering fertility. Among manifestations of the latter she includes primary dysmenorrhea, but this seems very questionable. As a matter of fact, typical primary dysmenorrhea is reasonably good evidence of ovulation, thus giving such patients a definite edge on at least that group of patients in whom anovulatory cycles are an important factor in sterility. This of course does not mean that all ovulating women have menstrual pain, as this would be absurd. Again, while sexual frigidity may be a definite factor in sterility, I believe this would be hard to establish statistically, except possibly by invoking the lessened frequency of coitus in women of this group.

White apparently has more confidence in the hormonal therapy of subnormal men than do most other students of the subject. On the other hand, not many will disagree with her in the statement that fertility and sterility depend upon a summation of the factors present in both partners. For example, a highly fertile female may conceive even if the husband is definitely below normal, and vice versa, whereas a low level of fertility in both partners is likely to spell a sterile marriage.

In spite of all that has been written, even in lay publications, about "rhythm" on the one hand and the optimum time for fertilization on the other, it is surprising how many women are still ignorant on this point. Simple advice on this point, with the suggestion of complete or relative abstinence at the unfavorable phases, and coital concentration at the optimum period, may in itself turn the trick in some cases.

White obviously agrees with Sharman as to the surprising frequency of subclinical

tuberculosis as a cause of tubal closure, and, indeed, seems to go him one better. She quotes him as believing that the majority of women with tubal occlusion, in whom no obvious cause is ascertainable, have such tubal tuberculosis, a rather startling statement which I do not think would be accepted by most gynecologists. It will be recalled that Sharman's study, which was abstracted and commented upon in a previous issue of the Survey (February, 1946, p. 149), revealed that endometrial biopsy in sterility patients showed an incidence of 5 per cent of unsuspected tuberculosis in the endometrium, a proportion higher than anyone else has noted. Conceding that unsuspected tubal tuberculosis is a factor not to be overlooked in the explanation of tubal closure, we do not as yet have sufficient data available to do more than speculate as to its relative frequency or infrequency.—Ed.)

## A MEDICAL SERVICE FOR THE TREATMENT OF INVOLUNTARY STERILITY

MARGARET H. JACKSON

*Eugenics Rev.*, 36: 117-125, 1945

It has impressed itself on the writer that the positive and negative aspects of family planning should be dealt with under one scheme. The ideal family planning centre would be a friendly place where married couples could come for advice not only on family spacing and limitation and marital difficulties, but also on involuntary sterility and minor gynecological troubles; where pregnancy tests could be carried out; and where pregnant women could be guided and referred, when necessary, to private doctors, midwives and hospitals. The author speaks from experience of how the work has developed at the Exeter clinic.

At Exeter and its branch clinics, there has been a marked increase in the percentage of patients coming because of inability to conceive, indicating a new public consciousness that something can be done about sterility. Since the majority of these people are in the lower income groups, with nearly all the wives working, it has been desirable to keep the procedure ambulatory, simple and inexpensive. The work has been restricted by lack of funds, time and space, and by the necessity to deal in person and in some detail with the wife only.

All cases do not require full investigation immediately; simple instruction and advice may be given first. If no pregnancy occurs in a few months, it is well to carry out further investigations. These are carried out in order to obtain answers, as far as possible, to the following questions:

1. Are there any endocrine defects in either husband or wife?
2. Are there any toxic factors present to depress gonadal function?
3. Are there any faults in delivery or reception of semen?
4. Are there sufficient normal sperm produced, and is their motility and viability adequate?

5. Do the sperm survive well in the wife's genital tract and are they likely to reach the ovum?
6. Is there any obstruction in either genital tract?
7. Is ovulation occurring, and when in the menstrual cycle?
8. Are conditions favorable for embedding?
9. Are any genetic lethal factors present?
10. Are any psychological difficulties present?

In the more obstinate cases, some or all of the following investigations have been carried out. Vaginal fluid has been examined in between 400 and 500 women. The post-coital, Sim's or Huhner's test has been performed on about 400 women. Some 500 endometrial biopsies have been taken on more than 250 women. More than 250 tubal insufflations have been done; Gordon King's apparatus has been found satisfactory and easy to handle. Uterosalingograms are done only on carefully selected cases; some 50 have been done. When the husbands are willing to be examined, they are provided with a container and instructions for collecting specimens for seminal analysis. Some 350 specimens have been examined from more than 250 men. Testicular biopsy has been done in one case only.

No attempt can be made here to discuss the findings or detailed results of treatment. Of 389 women found to be subfertile, 100 have been lost trace of. Of those followed up 135 have conceived on one or more occasions. Those pregnancies that have terminated have done so as follows:

Live births—74 (3 the result of artificial insemination)

Stillbirths or miscarriages—46

29 are at present known to be pregnant.

(See comment on following abstract of paper by Perloff.—Ed.)

## THERAPY OF INFERTILITY IN THE FEMALE

W. H. PERLOFF

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Clinics, 5: 829-846, 1946

This writer discusses the more important practical features in the diagnosis and treatment of infertility. He emphasizes the importance of careful investigation into the general medical, psychologic and endocrine status of both marital partners, as well as the necessity of study of the reproductive system.

At the present time, tubal insufflation appears to be the most important and useful single diagnostic and therapeutic procedure available for the study and treatment of the infertile female. Rubin reports that of 3200 female patients studied, the only treatment for 386 of the 590 who conceived was tubal insufflation.

Endocrine therapy is of value only in producing growth of the hypoplastic uterus and perhaps in inducing ovulation. Estradiol benzoate, 10,000 R.U. intramuscularly 3 times weekly for 3 weeks, with a rest period of one week, repeating this series for 3 months, has resulted in pregnancy in certain instances of hypoplastic uterus. If the bioassay shows a low estrogen and a high gonadotropin value, the prognosis is extremely poor. Should the bioassay point toward a primary pituitary hypofunction, the outlook is much more hopeful. Exposure of the pituitary and ovaries to low dosage x-ray therapy is a valuable procedure in selected cases in which there is evidence of inadequate production of pituitary gonadotropic hormones. This includes 3 weekly x-ray treatments of 80 r over the ovarian region and 40 r over each side of the pituitary region, making a total dosage of 240 r over the pituitary and a similar dosage over the ovaries.

Regardless of the type of treatment employed, all reports dealing with the management of infertility should be interpreted with due consideration to the extreme variability of the factors involved and the circumstances under which each patient has been treated. 5 figures.

(Everyone will agree that the introduction of tubal insufflation by Rubin just a little more than a quarter of a century ago marked the most important advance of our generation in the study of female sterility problems. Not only is it of prime diagnostic value, but there is no question of its not infrequent therapeutic efficacy as well. Scarcely second to this procedure in the modern investigation of sterility is the increased recognition of the frequency of the male factor and the increased knowledge as to the significance of seminal variations in count, morphology and other characteristics. Many other possible factors must of course be envisaged in the intelligent study of sterility patients, although the essentials do not constitute the formidable ritual which some would make it appear.

The yield of successes in the treatment of sterility is on the whole gratifying, though no sensible gynecologist will delude himself into thinking that the occurrence of pregnancy is always the result of the treatment he has carried out. He undoubtedly is given undue credit in many cases, and ordinarily does not protest too much about receiving it. I suppose it is the obstetricians who get more thrills than any of the rest of us in watching the ineffable happiness of mothers to whom they bring much wanted babies, but the joy brought to a woman who has yearned for a baby for many years by the news that she has embarked on what to her is the greatest of adventures also makes the doctor "glad all over", in the words of the saccharine "Little Annie Rooney."—Ed.)

## THE CAUSATION AND TREATMENT OF IMPOTENCE

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Practitioner, 158: 289-294, 1947

The initial broad classification of impotence, or inability to perform the sex act, into psychogenic, or primary, and organic, or secondary, is not quite satisfactory. If more were known of the body-mind relationship, it would probably

be found that organic factors often play a part in the genesis of what are regarded as psychological troubles.

An inability to perform the sex act satisfactorily is extremely common among modern civilized man. Hamilton found that only 55 per cent of the husbands he interviewed, among a large number of married couples, were satisfied with their sexual capacity. Most of these men belonged to the more cultured sections of American society. Modern conditions of living and modern systems of education would therefore not appear conducive to sexual efficiency. The author has rarely, if ever, met a man who could be said to be satisfactorily adjusted to his environment and yet suffered from sexual impotence.

Among the organic causes of impotence, abnormalities of the external genitals are very uncommon. Such a handicap as penile curvature is often easily overcome, provided the lesion has not occasioned psychological difficulties. Fibrous cavernositis usually occurs in middle life, when coitus is of less importance, and minor obstacles such as a tight foreskin are easily remedied.

The endocrine dysfunctions likely to lead to impotence are hypogonadism, hypopituitarism and hypothyroidism. The first of these responds readily to testosterone therapy.

Lesions of the central nervous system which may be responsible for impotence are tabes, general paralysis of the insane, spina bifida, concussion and peripheral neuritis. Impotence may result from any severe disturbance of general health, such as diabetes, neurasthenia, alcoholism, drug addiction and auto-intoxication from chronic infection.

No concise account can be given of the different types of psychological impotence, since psychology is a system of knowledge which rests on unknown foundations. The writer attempts merely to discuss some of the more common psychological factors responsible for impotence.

Sometimes failure to perform the sex act is merely the fruit of ignorance. Often this is the case in "first-night impotence". Before marriage the bridegroom may have believed that his genitalia were smaller than those of his fellows, or he may have had guilt feelings about masturbation. Should the slightest difficulty occur on his honeymoon, the man's worst fears will be confirmed and he may become convinced that he is impotent.

The factor of fear takes many forms. Fear of sexuality, fear of women in general, fear of contracting venereal disease, even though this danger does not exist in marriage, and fear of masturbation are cited as examples.

Another class of case is due to weakness of sexual desire. The strength of desire depends upon individual psychological and endocrine make-up. Should a weakly sexed man marry a passionate woman, he may often attempt intercourse with little desire, and gradually, failure will undermine his confidence in his sexual capacity. Often anxiety to have a child has the same effect, and the author has known the instructions of gynecologists that intercourse should take place on certain dates to have the effect of rendering a husband impotent. Sometimes weakness of desire is explained by the fact that the man is not physically attracted to his wife, having married her for companionship, a home, etc.

There is also a large group of cases in which there is an abnormality of desire, of which sex inversion and homosexuality are examples. If the abnormality is slight, a change in the setting and ritual of intercourse may help; in other cases prolonged psychotherapy is needed to effect a cure. In still others, reorientation of sexual desire is impossible.

Lastly, 2 special types of case are discussed, namely, premature ejaculation and absence of ejaculation. The former is probably the most common difficulty encountered in marriage and is difficult to cure. Although failure to obtain an emission is rarer, it is far more commonly met than textbooks imply. The cause is psychological.

Physical treatment of impotence includes treatment with drugs, such as yohimbin, damiana, strychnine, nux vomica and arsenic and phosphorus preparations; endocrine therapy, including the male hormone and small doses of thyroid; and a number of local and surgical measures. The author considers that the latter group has a very small place in the treatment of impotence. Among the local measures advocated are the passage of cold sounds and psychrophores, local applications and diathermy and prostatic massage. Recently, Lowsley (1942) designed an operation to tighten up the ischio-cavernosus and bulbo-cavernosus muscles so that their action in bringing about an erection is enhanced. While the writer has had little experience with this operation, he believes that it is based on a wrong conception of impotence. It must be remembered that any operation on the genitalia will have a strong suggestive action on the patient's mind. The author has cured one case of impotence by making a simple skin incision and suturing it; the patient was convinced that he had a torn ligament.

Psychological treatment is undoubtedly of the greatest importance. The preliminary examination must be a very thorough one, if for no other reason than to satisfy the patient that he is being properly dealt with. The wife should be interviewed, since she may furnish useful information about her husband's troubles, she may herself be an important factor in his impotence, and successful treatment depends upon her collaboration and understanding. Treatment demands much patience and is often difficult. Some cases will respond to common sense methods; others will have to be handed over to a competent psychiatrist.

(The first paragraph of this abstract would lead one to expect a reactionary discussion of the subject, accenting organic rather than psychological factors in impotence, but this is not borne out by a reading of the paper. As a matter of fact, most of the author's excellent discussion of the problem deals with the psychological factors which are much more frequently concerned in sexual impotence than the organic. This paper is especially recommended to those unimaginative urologists who take the short cut of treating such patients with prostatic massage or the introduction of a cold sound instead of the much more laborious and time-consuming plan of digging into the psychological causes and at least trying to correct them, with or without the assistance of a trained psychiatrist.—Ed.)



## MISCELLANEOUS

### EUGENICALLY DESIRABLE TYPES: A SYMPOSIUM

M. NEWFIELD, G. ELEY AND BARBARA S. BOSANQUET

Eugenics Rev., 38: 133-141, 1946

Dr. Newfield: This writer defines a eugenic society as one in which the evolutionary trend is in the right direction; in which the genes concerned with the transmission of the finest qualities of body, mind and spirit are widely distributed and perpetuated from generation to generation; and from which the less desirable genes are as far and as fast as possible eliminated.

There are some qualities, desirable in themselves, whose widest dissemination must always be a major eugenic objective (good health and physique and high intelligence), just as there are others, such as grave mental and physical disorders, that any society would be best without. However, granting this, the writer believes it is still a eugenic ideal to tolerate and rejoice in those differences between people and races which add zest to the life of the individual and contribute, by cross-fertilization of divergent cultures, to the development of society.

Mr. Eley: This writer approaches the subject by discussing certain basic characteristics. First he mentions good health. As for intelligence, he does not think that today we can have too great an increase in the amount of intelligence available in our society. It is suggested that what we would want for our ideal society in the way of intelligence would be:

1. A good proportion of people of the highest intelligence chosen by intelligence and efficiency tests.

2. A very substantial body of people chosen by efficiency tests to fill the "good lieutenant" class.

3. A still larger body of people who would be prepared and contented to perform the great mass of honorable tasks indispensable to the community. These would be moderately intelligent, sound, sensible people who would be selected by a test for tenacity, shrewdness and not too much imagination.

Mrs. Bosanquet: This writer attempts to offset those messengers of despair who say "What does it matter, saying all this about good heredity; people are going to fall in love with the wrong people, and nothing will stop them marrying." Certainly, a man's heart, once set, will not be changed by having information forced upon it. But the direction in which the heart is set can be influenced beforehand by education. Once certain fundamentals are proved, it should be possible to formulate standards that we want to achieve, and to see that they are taught to all boys and girls at home and at school. We need entertain no illusions as to the speed with which a good society will result from better marriages.

(This abstract, while not of conspicuous gynecological pertinence, has been included to emphasize that the eugenics movement is still going on, although thus far there has been no noteworthy result, and although the whole concept is still largely in the stage of discussion among the handful of enthusiasts, with much difference of viewpoint among them. For the present I am pessimistic enough to agree with the view attributed to some of us by Mrs. Bosanquet, that "What does it matter, saying all this about good heredity; people are going to fall in love with the wrong people, and nothing will stop them marrying."—Ed.)

## INTELLIGENCE AND FERTILITY: A PLEA FOR RESEARCH

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*Eugenics Rev.*, 36: 126-127, 1945

Compared to the tempo of environmental change, the decline in average mental capacity seems slow, but compared to the natural selection rates which probably operate in the animal world, it is galloping. Faced with this disconcerting conclusion, the author has long sought for some loophole of escape within the logical structure of the evidence. The calculation involves a number of factors which, with 2 exceptions, are small and produce mutually compensating distortions. The exceptions are the celibacy rate and the barren marriage rate. If there were a tendency for celibates and childless parents to be less intelligent than others, it might be that the average level of intelligence is today actually being maintained, in spite of the differential connected with size of family. To the author's knowledge, there is no evidence, in any way fit to be compared to the population measurements in the 1936-1938 researches, available on this point. The present article is a plea for information on this important issue.

There are 3 main ways in which the prediction of the trend in intelligence could be made more reliable: (1) By testing a true cross-section of the *adult* population, at the end of the reproductive period, and relating the results to reproduction measures—this would automatically include celibates and childless married couples; (2) By re-testing, after a lapse of at least a decade, the continuation of the populations originally tested, to see if the calculated decline has actually occurred; (3) By supplementing the original researches with data on the specific influences—celibacy and childless marriages—which could then not be assayed.

(The concept of eugenics for the human race is a noble one, but it is a very, very long range movement and in our day it seems very nebulous indeed, as would appear from both this abstract and the preceding one.—Ed.)



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# Obstetrics

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## PHYSIOLOGY OF PREGNANCY, LABOR AND PUERPERIUM

### STUDIES IN FETAL METABOLISM

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J. Biol. Chem., 169, 723-738, 1947

The origin of the constituents of the mammalian fetus has been the subject of controversy, 2 processes coming into consideration: transplacental absorption from the maternal circulation and synthesis in the tissues of the fetus proper.

In regard to the transplacental passage of fatty acids, the most impressive evidence has been the finding of elaidic acid in the fetal fat after the feeding of this abnormal fatty acid to pregnant animals (J. Biochem., Japan, 25, 579, 1937) (J. Biol. Chem., 118, 123, 1937). Unequivocal proof for the synthesis of fatty acids and cholesterol in the chick embryo has been adduced, but similar evidence in the mammalian fetus is lacking. There appears to be no reasonable doubt that glucose crosses the placenta, and the relative abundance of fetal glycogen, compared with concentrations in adult tissues, has repeatedly been observed. Whether the latter results from excessive glycogen deposition or lack of glycogen mobilization has not been determined. The view that epinephrine crosses the placenta has been favored by some workers and contested by others. Similarly the transplacental passage of insulin has been the subject of controversy. The most frequent argument has centered about the increase in glucose tolerance incident to pregnancy in the diabetic, but this may be ascribed to the large consumption of maternal glucose by the growing fetus and need not indicate passage of fetal insulin into the maternal circulation.

The isotopic tracer technique seems to be well adapted to the study of some of these problems. The experiments here reported have been designed to investigate (a) the transplacental migration of certain body constituents, (b) the fetal synthesis of certain constituents, and (c) the control exerted on certain fetal metabolic processes by the maternal endocrine state. Pregnant rats, in which the placenta is, as in the human, of the "hemo-chorial" variety, were employed in this investigation.

The transplacental passage of fatty acids and of cholesterol has been studied by the administration to pregnant rats of samples of these materials suitably labeled with deuterium, and the isolation of corresponding products from their fetuses. The synthesis by the fetus of fatty acids, of cholesterol, and of glycogen has been investigated by measurement of the rate at which deuterium appeared in these materials in fetuses which had developed in a medium containing  $D_2O$ .

The effects of the injection of epinephrine and of insulin into the maternal circulation upon the quantity of the fetal glycogen have also been studied. If epinephrine crosses the placenta, and the fetal glycogen reserves are susceptible to its mobilizing influence, diminution in the quantity of fetal glycogen should result. Should insulin in the maternal circulation exert a direct action on the fetus, one might anticipate, as in the adult animal, an increase in the fetal glycogen reserves which, if laid down in the presence of  $D_2O$ , would be poor in deuterium. If, on the other hand, the direct action of maternally injected insulin was confined to the maternal tissues, the effect observed in the fetus would be secondary to the decrease in maternal blood glucose and the increase in the availability of 3-carbon fragments derived from glucose. In the light of earlier studies on the adult animal, such a shift in the availability of glycogen precursors would result in the deposition of glycogen rich in deuterium when the fetuses were allowed to develop in a medium containing  $D_2O$ .

The feeding of deuterio fatty acids and deuteriocholesterol to pregnant rats in the latter part of gestation resulted in the appearance of the corresponding deuterio compounds in the fetuses, proving that these compounds cross the rat placenta.

Enrichment of the body fluids of pregnant rats with  $D_2O$  resulted in the rapid incorporation of D into fetal glycogen, fatty acids, and cholesterol at rates indicating that these compounds are synthesized in the fetal organism.

The data indicate that, in the rat fetus approaching the 20 day stage of development, half of the fetal glycogen had arisen by synthesis in 12 to 18 hours, half of the fetal fatty acids in about  $1\frac{1}{2}$  days, and half of the fetal cholesterol in about  $2\frac{1}{2}$  days. The quantity of glycogen synthesized and deposited in the fetus per day was found to be approximately equal to the total amount of glycogen present at this stage of development; i.e., some 500 mg. per 100 Gm. of tissue. The synthetic rates in the fetus are all appreciably higher than the corresponding rates in adult rats.

Injection of epinephrine into the pregnant rat caused a drop in the content of fetal glycogen, suggesting that epinephrine crosses the placenta and that fetal glycogen is susceptible to its glycogenolytic stimulus.

The injection of insulin into a pregnant rat containing  $D_2O$  in its body fluids caused a slight increase in the deuterium incorporated into fetal glycogen, fatty acids, and cholesterol. This is attributed not to any direct action of insulin in the fetus, but rather to decreased availability of maternal glucose and increased availability of small fragments derived therefrom.

(As indicated in an editorial note in the last issue of the Survey (October, p. 602), the isotopic tracer technique is being used widely to reinvestigate placental transmission and the above report is a good example of the exact conclusions which this method affords. The gist of the authors' findings is that the origin of lipids in the rat fetus is two-fold: synthesis by the fetus as well as placental transmission. Although Goldwater and Stetten are able to demonstrate this fact much more precisely and convincingly than has heretofore been possible, the general conclusion reached is similar to that already established by other types of evidence.

The earliest investigations on this question, it will be recalled, seemed to show that the

fetus synthesized all its lipids from carbohydrates. Thus, Slemmons and Stander (Bull. Johns Hopkins Hosp., 34, 7, 1923; Slemmons, J. M.: Nutrition of the Foetus, Yale Univ. Press, New Haven, 1919), reached the conclusion that the placenta in man is absolutely impermeable to fatty acids, and this attitude was taken by Slemmons in his monograph on placental transmission. Slemmons and Stander laid especial emphasis upon the fact that there was no sort of parallelism between the variations in the level of fatty acids in the two bloods. The degree of anesthesia at delivery was found to have a marked effect upon the blood fat, but in spite of the consequent rises and falls, the fetal blood showed no corresponding variations, and if it changed at all, it changed quite independently. Contemporary studies, such as those of Plass and Tompkins on the phosphatides, (J. Biol. Chem., 56, 309, 1923) agreed in showing that the several lipid fractions, like total lipids, were always higher in the maternal plasma than in the fetal and that no constant ratio between the two bloods could be demonstrated.

Then, in the thirties, along came other sorts of evidence which showed that some of the fetal lipids, at least, must be transmitted through the placenta. This evidence is of two types. In the first place, the feeding of certain fats to pregnant animals influences the iodine value of the fetal fat. Thus, if a fat with a low iodine number is given, the fat stores of the mother will have lower iodine values than when she is otherwise fed; and the same effect is noted in the fetus but to a lesser degree. A similar relationship is found when fats of high iodine number are fed. The Japanese study on elaidic acid cited in the above abstract presents findings of the same kind. The second type of evidence demonstrating placental transmission of fats is that contributed by Boyd and Wilson who found a higher concentration of lipid substances in blood coming from the placenta than in that going to the placenta (Jour. Clin. Invest. 14, 7, 1935). This is plain evidence, of course, that fatty substances are given off to the fetal blood in its transit through the placenta. The same investigators clamped the cord immediately after birth and took blood from the umbilical cord at that time and again when the placenta separated. The second specimen invariably showed a higher concentration of phospholipids and usually more free cholesterol, ester cholesterol and neutral fat. In this connection it may be noted that all fetal fat derives from synbiologic principles, has long been skeptical of the thesis that all fetal fat derives from synthesis. Thus, he remarks that "no oviparous animal requires its embryo to synthesize its fatty acid from carbohydrate and the idea that viviparous embryos should be asked to do so does not fit in with the biologically valuable properties of intrauterine development." (Chemical Embryology, Cambridge Univ. Press, 1931, 3, 1524)

The findings of Goldwater and Stetten digested above, are of especial value because they integrate these two divergent beliefs in regard to the genesis of fetal fat. They show that the contention of both schools of thought are valid and that fetal lipids must be regarded as of dual origin.—Ed.)

## EFFECTS OF VARIOUS SEX HORMONES ON EXCRETION OF PREGNANEDIOL EARLY IN PREGNANCY

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Proc. Soc. Exper. Biol. & Med., 65, 283-289, 1947

Smith and Smith reported that the administration of diethylstilbestrol to a patient during pregnancy would increase the excretion of pregnanediol in the

urine. They concluded that synthetic estrogens will stimulate steroid metabolism in the placenta increasing the amount of available progesterone. These authors suggested the use of increasing amounts of diethylstilbestrol to prevent the accidents of late pregnancy, beginning with 30 mg. per day at the 16th week of the gestation and increasing the daily dose 5 mg. each week until the 35th week. Furthermore, it has been recommended by others that large amounts of steroid hormones be administered early in pregnancy to prevent abortion and to treat threatened abortion. The purpose of the present study is to determine if the sex hormones will increase the production of progesterone by the placenta early in pregnancy.

Diethylstilbestrol, testosterone propionate and progesterone were administered to 15 patients with normal pregnancies in order to study the effect of these substances on progesterone metabolism and pregnanediol excretion. Diethylstilbestrol and testosterone when administered daily in large amounts over long periods during the first 16 weeks of gestation did not alter the normal excretion of pregnanediol. The administration of progesterone, however, was followed by the prompt recovery of a considerable portion of the injected steroid as pregnanediol. If it is desirable to increase the amount of progestational hormone available during early pregnancy, it is more logical to administer progesterone in liberal amounts rather than diethylstilbestrol. However, it is the impression of the authors that there is no lack of progesterone in most of the pregnancies which threaten to end during the early months. Decreased pregnanediol levels may be an index of poor placental function.

## THE ESTIMATION OF HISTIDINE IN URINE AND ITS EXCRETION BY NORMAL AND PREGNANT WOMEN

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*Biochem. J., 41, 226-230, 1947*

The urinary excretion of histidine has been a matter of interest since Voge (1929) demonstrated an increase in the excretion during normal pregnancy. Subsequently, it has been shown that the excretion drops in preeclamptic toxemia. In the present paper, the writer describes the results obtained in the course of 2 normal pregnancies together with observations on the histidine excretion by normal women at different times during the menstrual cycle.

A colorimetric method is described for the estimation of histidine in urine. The method is based on a color reaction described by Knoop and consists of a bromination of the histidine, removal of excess bromine and heating the product at 100 degrees when a characteristic color develops. In the present revised technique, 2 pigments may be produced according to the pH at which the reaction is carried out.

The 24-hour urinary excretion of histidine of 38 normal women at weekly intervals during a complete menstrual cycle has been examined. No significant trends were observed and no correlation with gonadotrophic hormone activity was apparent.

Two cases of pregnancy were examined from about the third month of gestation until delivery. Case I was a normal pregnancy; case II was complicated by anemia during part of the pregnancy. Case I showed a histidine output considerably above that of case II, with a definite peak at 5 months. The excretion in case II was fairly uniform, but some of the levels recorded have been associated in other patients with preeclamptic toxemia.

The diets of these 2 patients were examined. The protein and iron intakes were normal for case I (examined during the fifth month), but they were low for case II (examined during the eighth month) for a diet of late pregnancy. Despite the low protein intake in case II there was a retention of 117 g. protein over the 6 days.

To study further the effect of ingested histidine on its excretion, case II ingested 2 g. of *L*-histidine hydrochloride and the 24-hour excretion values were determined for 5 days before and 4 days after its ingestion. There was a drop in histidine output on the fifth control day followed by a rise after ingestion of the histidine, with a steady fall over the following 3 days.

Case II showed a hemoglobin level at the third month of 95 per cent, which had dropped to 55 per cent at the time of dietary study and rose again to 92 per cent a week before delivery. Iron salts were given from 8½ months to delivery.

From these results, it is apparent that individual histidine excretion may vary between wide limits, both in normal and pregnant women. There is some evidence that dietary intake of protein which contains histidine may influence output, and this may explain variations in excretion in normal individuals, but it does not explain the rise which occurs in pregnancy, although it may influence the rise. In view of the high histidine content of hemoglobin, this is a possible source of urinary histidine; the rise in excretion during pregnancy may be associated with an increased turnover of this material. Even if this suggested connection between hemoglobin and urinary histidine is correct, this fact sheds no light on the causation of the greatly increased urinary histidine excretion of normal pregnancy. 3 figures.

(The whole problem of histidinuria in pregnancy was reviewed in detail in an editorial note in the June, 1946 issue of the *Survey*, pp. 301-304. As there indicated, this is an intriguing question because of the huge amounts of histidine excreted in pregnancy, but the net yield of the 100 or more articles on the subject has been disappointingly meager. The suggestion of Ernest Page that the histidinuria of pregnancy is due to lowered renal threshold would seem the most tenable explanation thus far advanced.—Ed.)

LEUKOCYTE COUNTS IN NORMAL WHITE WOMEN  
BEFORE AND AFTER DELIVERY

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Am. J. Clin. Path., 17: 483-487, 1947

Despite frequent references in the literature to physiologic leukocytosis of pregnancy, there is considerable variation in the values reported. In order to facilitate the interpretation of the leukocyte count in labor, the authors studied a series of total and differential counts of the white blood cells in normal pregnancies.

Certain rules were adopted for selecting the subjects. Those patients selected for study (1) had no abnormal physical findings, (2) had spontaneous onset of labor and duration of labor did not exceed 36 hours, (3) had gestational periods not less than 220 days after the beginning of the last menstrual period, (4) had no history of complications during previous pregnancies or of complications during the present pregnancy, (5) the leukocyte count did not exceed 35,000 and the erythrocyte count was at least 3,000,000 per cu. mm., with at least 60 per cent or 10.2 gm. hemoglobin, and (6) the amount of bleeding in the third stage did not exceed 600 cc. Fifty-seven white patients were chosen, whose ages ranged from 17 to 42 years. Nineteen of the 57 patients were primigravidas. Counts were made in a series of 28 patients before delivery and in a series of 29 patients after delivery. Schilling hemograms and total white blood cell counts were made on all patients. The degree of "shift to the left" was indicated by determining the percentage of immature forms among the total number of neutrophilic leukocytes.

In bloods obtained from patients more than 10 hours before delivery, the average shift to the left was 12.6 per cent and the average leukocyte count was 10,275 white blood cells per cu. mm. In patients whose blood was obtained less than 10 hours before delivery, the average shift to the left was 24.9 per cent and the average leukocyte count was 13,742 white blood cells per cu. mm. In patients whose blood was obtained less than 10 hours after delivery, the average shift to the left was 29.7 per cent and the average leukocyte count was 17,960 per cu. mm. Thereafter, there was a tendency for the count to shift to the right.

From these studies it would seem apparent that the shift to the left and the total leukocyte count increase remarkably about 10 hours before delivery, continue for approximately 10 hours, and then gradually subside.

(These findings confirm previous studies in showing that the leucocyte count rises progressively during labor and at full dilatation ranges between 15,000 and 20,000, with an increased preponderance of young neutrophils in the blood picture. It is common experience that this leucocytosis of labor may return rather slowly to normal with the result that leucocyte count in the first few days of the puerperium may be of the order of 15,000 in perfectly normal patients. At this time, moreover, the blood sedimentation is extremely rapid. From a clinical viewpoint these facts are important to bear in mind whenever leucocyte counts and sedimentation rates come up for evaluation during this period.—Ed.)

# MANAGEMENT OF NORMAL PREGNANCY, LABOR AND PUERPERIUM

## THE ROLE OF RADIOLOGY IN OBSTETRICS

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Practitioner, 159: 22-28, 1947

The author lists, as the main indications for radiological examinations in obstetrics, the following: (1) Demonstration of the normal and abnormal fetus; (2) Demonstration of the maternal pelvis; (3) Demonstration of the fetal and maternal soft tissue structures; and (4) Investigation of the maternal urinary tract in pregnancy and the postnatal period.

The differential diagnosis of early pregnancy from a pelvic tumor such as a cyst, fibroid or hydatidiform mole is sometimes difficult, but abnormal calcification typical of a fibroid, or dental structures in a dermoid, may be revealed by radiography and facilitate the diagnosis. X-ray examination is advisable in very obese women prone to long periods of amenorrhea and in pseudocyesis. Radiology can be of definite help in the diagnosis of pregnancy only after the 16th to 18th week, although fetal structures have been visualized on skiagrams as early as the 14th week of pregnancy. Radiological examination is useful for determining the presentation and position of the fetus, particularly in women with tense or obese abdominal walls.

The differential diagnosis between multiple pregnancy, large fetus and hydramnios is often difficult clinically, and X-ray examination may explain a discrepancy between uterine size and estimated duration of pregnancy. It should be remembered that one of the fetuses may die early and the dead fetus thus be missed; again, one of the fetuses may move during the exposure and its outline become blurred so as to be unrecognizable.

The radiological estimation of fetal maturity may be asked for, if the clinical history is unreliable. The not infrequent need for termination of pregnancy in the interest of the child makes this problem a very practical one. A rough idea may be deducted from the general size of the fetus on routine skiagrams, if the patient's position and the tube-film distance are known. However, a more reliable method for estimating fetal maturity is the appearance of the ossific centres of the fetal bones. The cuboid, if present, indicates that the fetus has reached at least the 36th week. The lower epiphysis of the femur, on the appearance of which much reliance is usually placed, may appear at any date between the 35th to 40th week, and some authors claim to have observed it in the 24th week of gestation.

The diagnosis of ectopic pregnancy by radiological investigation is usually possible only after the 5th month of gestation. When the fetus occupies an asymmetrical or high position in the pelvis, the existence of an ectopic pregnancy may be suspected, although a pelvic tumor with pregnancy may cause a similar



uterine displacement. Radiography after the induction of lipiodol into the uterine cavity may reveal a normally shaped or elongated uterus in ectopic pregnancy. This method, however, is justifiable only when there is strong clinical or radiological suspicion of extra-uterine pregnancy and when termination of the pregnancy is desirable.

The most reliable sign of fetal death is an overriding of the fetal skull bones (Spalding's sign), the overlap at the sutures taking place from shrinkage of the brain. This sign must be regarded with caution in cases near full term, as the moulding of the fetal head in labor may cause a similar radiographic appearance. Spalding's sign may be found within 4 to 7 days of intra-uterine death, but it is desirable to repeat the X-ray examination after the interval of a week, if the sign is not present at first. The presence of hydramnios is said to prevent the development of Spalding's sign. Other less reliable signs of intra-uterine death are:

(1) The rolled-up attitude of the fetus. This appearance is of special importance in non-vertex presentations, for in this presentation Spalding's sign may be absent.

(2) Lordosis of the lumbo-sacral spine and falling-in of the thoracic cage, with a kypnotic deformity of the dorso-lumbar spine. For the demonstration of these deformities skiagrams may have to be taken in a lateral view.

(3) Defective calcification of the fetal skeleton. This may be caused by faulty metabolism of the mother, and be simulated by over-exposure of the X-ray film.

(4) Smaller fetal size than would be expected from the period of gestation.

(5) Absence of increase in the size of the fetus measured at frequent intervals.

(6) Recently gas in the fetal circulation has been described by Boyd Roberts (Am. J. Roentgenol., 51: 631, 1944) as a sign of intra-uterine fetal death.

The writer discusses the role of radiology in demonstrating fetal abnormalities. Anencephaly is occasionally mistaken for a breech presentation. Its characteristic radiological appearances are absence of the cranial vault and the presence of broad shoulders and a well-developed, sometimes post-mature skeleton. Inencephaly is characterized by imperfect formation of the occiput in the region of the foramen magnum, a spina bifida and an angular spinal deformity with marked retroflexion in the cervical region. Retroflexion or hyperextension of the fetal head is present in other conditions, such as a fetal thyroid tumor, or in simple overextension of the head in face or brow presentations. Hydrocephalus is easily demonstrated if the size of the fetal skull and its relation to the fetal spine and maternal pelvis can be established. The skull is large, the skull bones relatively thin, separation of the fontanelles may be demonstrated, and there is sometimes a characteristic forward bulging of the brow. An associated spina bifida or meningocele may be shown by an angular deformity of the spine, usually in the lumbar region. The diagnosis of hydrocephalus must be established with care and skiagrams should be taken in 2 or 3 different positions, as distortion and apparent enlargement of the fetal head may be seen when the head is comparatively distant from the film and some magnification occurs. A meningocele

cannot always be diagnosed by X-ray film, as the soft tissue opacity caused by the sac cannot be differentiated from the amniotic fluid. However, its presence should be suspected when an angular deformity of the spine suggests a spina bifida. Other rare congenital abnormalities of the fetal skeletal system which can be diagnosed antenatally are: osteogenesis imperfecta, achondroplasia, Albers-Schönberg's disease (marble bones), cranio-cleido-dysostosis, and lacunar skull.

In some cases of hydrops fetalis (erythroblastosis fetalis neonatorum) there are no skeletal changes, but Javert (*Surg., Gynec. & Obst.*, 74: 1, 1942) has drawn attention to 3 X-ray signs:

- (a) The edema of the scalp causes a "halo shadow" about the fetal skull.
- (b) The placental shadow is unusually large.
- (c) The fetus assumes the "Buddha position", as the 4 limbs are splayed away from one another and from the body by the enlarged abdomen.

In cases of erythroblastosis fetalis in which prenatal endochondral bone formation is interfered with, transverse bands of increased and diminished density develop in the ends of the shafts. Caffey ("*Pediatric X-Ray Diagnosis*", Year Book, Chicago, 1945) and Follis and his colleagues (*J. Pediat.*, 21: 80, 1942) found diffuse sclerosis of the shaft in 5 cases.

Pelvimetry may be necessary to determine minor pelvic deformities, and for the measurements of pelvic diameters at the inlet and outlet. X-ray pelvimetry has been carried out at University College Hospital on some 1,800 cases during the past 5 years. The different methods described all aim at determining a correction factor for the distortion caused by the distance of the plane of the pelvis to be measured from that of the film. For the determination of the diameters in the lateral plane at the inlet (true conjugate), and at the outlet (anteroposterior diameter) the author has used the method of Chassar Moir:

A metal rod bearing an  $\frac{1}{2}$ -inch scale is placed on to the natal cleft of the patient's buttocks, and the patient is X-rayed in the erect lateral position. The length of the conjugate is measured on the film with callipers, and this applied to the film image of the metal rod enables the conjugate to be read off immediately.

To determine the level of the inlet and outlet planes of the pelvis for measuring their transverse diameters many different methods have been evolved. Readers who are especially interested in this subject are referred to the work of Rohan Williams ("*Recent Advances in Obstetrics and Gynaecology*" (Bourne and Williams), 11th edition, London, 1946) and Chassar Moir (Browne's "*Antenatal and Postnatal Care*", 6th edition, London, 1946).

Study of the placental site is called for in ante-partum hemorrhage when the differential diagnosis between accidental hemorrhage and an abnormally placed placenta is difficult. In good quality skiagrams it is sometimes possible to visualize the placenta without a contrast medium. The normal placenta may be seen as an opacity merging with the shadow of the uterine wall and separated from the fetal bones by a clear zone due to vernix caseosa and fetal subcutaneous fat. Suspected placenta previa can be investigated radiologically without harm-

ful effects by injection of air or a 5 per cent solution of sodium iodide into the bladder.

In normal pregnancy there occurs a dynamic dilatation of the kidney lumen and ureters; the degree of dilatation is not great and is more marked on the right side. Urinary clearance is slow and the contrast medium may be visible in the kidneys and ureters an hour or 2 after the intravenous injection. In pyelitis of pregnancy the dilatation is more marked and may reach the stage of well-marked hydronephrosis with accompanying considerable delay in clearance. 15 figures.

(This article is a concise and well-tempered review of the uses of radiology in obstetrics and makes a number of important practical points. In regard to the author's statements concerning ossification centers as indices of fetal maturity, it must be remembered that the chief utilization which the obstetrician wishes to make of these is to establish the gestational age of the fetus in utero in cases in which premature delivery is indicated. On these *in utero* films, ossification centers which might be plainly visible on films taken after birth, may not show at all because of the obscuring effect of the abdominal and uterine walls; hence, most of the observations reported in the literature must be considerably modified when applied to x-ray films of fetuses before birth.

The standard article on ossification centers of the newborn is still that of Adair and Scammon despite the lapse of 26 years since its publication (*Am. J. Obst. & Gynec.*, 2, 35, 1921). Basing their conclusions on 1717 observations, these authors found that the inferior femoral epiphysis is present in about 1 case in 20 in the 8th fetal month, in 1 case in 3 in the 9th month, in 6 cases in 7 in the 10th month, and in about 19 cases in 20 at full term. Allowing for the error involved in intrauterine films, it may be deduced from these figures, coupled with general clinical experience, that whenever the inferior femoral epiphysis can be demonstrated in a fetus in utero, a gestational age of 35 weeks or more can be assumed with a high degree of certainty; the absence of this center on such films, however, by no means precludes maturity. In regard to Grossman's statement that the cuboid, if present, indicates that the fetus has reached the 36th week, this is well and good but this center is infrequently seen on *in utero* films. If it can be definitely visualized on such films, it is of course proof positive of maturity. On postnatal films Adair and Scammon encountered it in about 1 case in 25 in the 9th month, in about 1 case in 4 in the 10th month and in about 3 cases in 5 in full term newborn.—Ed.

## THE EFFECT OF IODINE THERAPY ON THE BLOOD IODINE AND BASAL METABOLIC RATE DURING PREGNANCY

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*West. J. Surg.*, 55, 375-382, 1947

As a preliminary review of the literature the authors summarize the pathogenesis of the simple goiter of pregnancy, show how it may be considered a "work

hypertrophy" and then enumerate the changes which occur during pregnancy in (1) blood iodine levels, (2) basal metabolic rate, (3) incidence of toxemia and (4) congenital malformations.

This study attempts to correlate the effects of iodine therapy on the B.M.R. and blood iodine levels of the mother and infant during pregnancy. The normal values for blood iodine were first determined and shown to range from 8.4 to 12.4 micrograms % in nonpregnant adults living in the Pacific Northwest. The average B.M.R. in non-iodized, pregnant patients was found to be higher than the averages reported elsewhere.

Two groups of patients were utilized for the study: (A) Control group who received a normal well balanced diet and (B) An iodine treated group who were given one tablet (0.03 grams) of iodine daily. The results were as follows: In the first trimester of pregnancy 12 untreated control patients showed an increased B.M.R. to 12.1 per cent above normal. The average blood iodine increased to 16.2 micrograms %. In the second trimester 14 iodine treated patients had an average B.M.R. of +10 per cent compared with the average of +22.4 per cent for 24 control patients. The blood iodine increased in the treated patients to 39.7 micrograms % but only went to 17.4 in the controls. In a total of 61 control patients studied during the third trimester little change is noted. However, in 24 treated patients the B.M.R. increased to an average of 17.8 per cent, while the blood iodine level dropped to 28.4 micrograms %. At delivery the blood iodine level showed increases in both groups. For 6 weeks postpartum the B.M.R. and blood iodine level remained elevated. In 26 control patients the average B.M.R. was +15.5 per cent while in 10 treated patients it was 11.8 per cent. The blood iodine in the controls was 12.9 micrograms %; in the treated (no iodine since delivery) it remained elevated to 19 micrograms %.

The average cord blood iodine level of infants at birth (35 control—12 treated) remained within normal limits established for nonpregnant adults in this area (average 11.2 micrograms %).

This study suggests that Lipoiodine medication during pregnancy tends to decrease thyroid hyperplasia and, later, exhaustion of the thyroid. Sufficient factual evidence has been presented to warrant the prophylactic use of iodine medication during pregnancy.

(The introduction of thiouracil, together with reports of a number of hyperthyroid gravidæ therewith, raises anew the question of thyroid behavior in pregnancy, both maternal and fetal. Blood iodine studies, such as the above, pose still further questions. While I am not prepared to agree with the authors that prophylactic iodine medication is warranted as a routine in pregnancy (at least in Maryland), I am convinced on several scores that this whole field is most fertile for reinvestigation.—Ed.)

## METHERGINE AND ITS EFFECT ON THE PREGNANT UTERUS

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West. J. Surg., 55, 371-374, 1947

Methergine (d-lysergic acid d-l-hydroxybutylamide-2), a partial synthetic ergate preparation, was administered to 750 patients intravenously and orally and was found to be a safe oxytocic. There were no maternal deaths in the series and there were 9 fetal deaths, 4 of which were premature infants. None of the fetal deaths could be attributed to the use of methergine. One cc. of methergine was given intravenously as the fetal shoulder appeared at the outlet. It was found to be effective in 20-30 seconds and lasted 6 to 8 hours. It did not produce tetany of the uterus or exert any toxic action on the patient. During the puerperium methergine tablets 0.25 mgms. were given for 2 days resulting in satisfactory involution of the uterus.

Blood loss was remarkably little in this series. About 90 per cent of all the patients lost less than 100 cc. of blood exclusive of bleeding from episiotomy. Fifty-seven per cent lost 50 cc. or less of blood exclusive of episiotomy. Methergine was also used as a method of induction of labor. It was tried in a series of 20 cases and compared with another series of 20 patients given pitocin induction. Methergine solution containing 0.2 mgms. per cc. was given hypodermically in doses of 1 to 3 minims to induce labor. All 40 patients in this series went into labor and delivered viable infants. The minimum effective dose of methergine was found to be 2 minims and of pitocin 1 minim. Methergine was administered every 30 minutes and the fetal heartbeat and muscle tone of the uterus were checked after each administration. The average number of injections of methergine before labor started were 6.6 and that for pitocin was found to be 5. After the third or fourth injection of methergine or pitocin the amniotic sac was ruptured routinely, except in breech presentation or when the head was not engaged. The onset of labor with methergine was 5.03 hours and for pitocin 3.1 hours. The length of labor induced with methergine was 10.2 hours, with pitocin 8.3 hours.

There was no evidence that methergine caused an elevation in blood pressure, was responsible for a ruptured uterus, caused uterine tetany, or produced convulsions. No patients were found sensitive to the drug.

From this study methergine reduced blood loss, shortened the third stage of labor and seemed to be a safe and effective agent for induction of labor in doses of 1 to 3 minims.

(In an editorial note in the June, 1946 issue of the Survey, p. 618, I expressed skepticism about the safety of methergine for the induction of labor and cited evidence in support of that viewpoint. The 20 cases reported above have not caused me to alter this opinion, although I do not doubt that methergine is a safe and efficient agent in the postpartal period. It is my feeling in general, moreover, that with a favorable cervix (soft, effaced, admitting a finger easily, better two), simple rupture of the membranes is adequate for the purpose without auxiliary medication; when the cervix is unfavorable, any method of induction, whether instrumental or medical, is hazardous.—Ed.)

## PATHOLOGY OF PREGNANCY

### THE VALUE OF THE COLD PRESSOR TEST IN THE PREDICTION OF HYPERTENSION AND TOXAEMIA IN PREGNANCY

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M. J. Australia, 1: 417-423, 1947

Hines and Brown, who first described the cold pressor test in 1932, found that the normal person responded to the stimulus (water at 4 degrees C.) by a slight rise in both systolic and diastolic blood pressure with a rapid fall to normal 3 minutes after removal of the stimulus. In the hypertensive person a much greater and more prolonged rise in blood pressure was obtained. The response occurred too rapidly to be due to hormonal or chemical factors. Hines and Brown believe that it must have a neurogenic basis and advance, as proof, the evidence that the response has been obtained after bilateral suprarenalectomy in dogs.

In the test, as described by Hines and Brown, the patient is rested for 20 minutes and the basal blood pressure is taken. One hand is immersed in water at 4 degrees C. and blood pressure readings are taken 30 and 60 seconds after immersion, from the opposite arm. The highest reading is the index of response. The hand is then removed from the ice water and blood pressure readings are taken at intervals of 2 minutes until the basal level is again reached. The patient is described as a hyperreactor if in response to the stimulus the systolic blood pressure rises above the basal level by more than 20 mm. Hg or the diastolic pressure by more than 15 mm. The return of the blood pressure to the basal level is delayed in patients with established hypertension.

Various authors have arrived at different conclusions as to the application of the ice pressor test in predicting hypertension in pregnant women. Reid and Teel and Chesley found the test to be unreliable. Dieckmann and his collaborators, Randall, Murray and Mussey, Briggs and Oerting, Browne, and Bak all found that hypertension and often toxemia developed more frequently in the later stages of pregnancy in hyperreactors to the cold pressor test than in the pregnancy of women giving a normal response to the test.

In the present paper the authors have attempted to obtain further evidence about this test by studying its effects on 2 groups of patients: (1) 215 women who had previously had a toxemic pregnancy in which the blood pressure had been raised, and who were available for study throughout a subsequent pregnancy; and (2) a large group of patients at 2 months and often also at 12 months after termination of a toxemic pregnancy. The authors followed Dieckmann's modification of the Hines and Brown test. The 3 points of difference were:

(1) the sphygmomanometer cuff was attached to the arm of the hand immersed in water; (2) the water was kept at 1 degree C.; (3) the hand was immersed in ice water for 2 minutes rather than one. Patients were rested for at least 45 minutes prior to testing, and several blood pressure readings were taken to determine the basal level.

Certain preliminary questions had to be answered before the clinical value of the test could be assessed. First was the conflicting statements with regard to the constancy of response when a patient was tested repeatedly. Serial cold pressor tests were performed on 69 patients who had had a previous toxemic pregnancy. On 23 of these the test was repeated as many as 5 to 8 times. Erratic results were obtained in only 12 of these instances. Of 144 women investigated at 2 and 12 months after pregnancy, constancy of results was observed in both tests on 106 patients. In 27 other cases in this group there was persistent hyperreaction at 2 months postpartum, with a decline to normal response at 12 months postpartum. In the 11 remaining cases a normal response was obtained at 2 months postpartum, but the response at 12 months was hyperreactive.

The second matter of preliminary interest concerns the variations in blood pressure during normal and abnormal pregnancies. The authors present their correlation of average basal blood pressure readings at monthly intervals during the pregnancies of normal, hypertensive, preeclamptic and mildly toxemic patients. It was found that there is a moderate rise above the upper limits of normal in both systolic and diastolic pressures in the last month of pregnancy, even in patients whose pregnancy is normal.

The third preliminary problem is what criteria indicate an abnormal response to the cold stimulus. From consideration of their own results and of the conclusions of other workers, the authors decided to assess the result of a test as indicating hyperreaction if a rise of at least 30 mm. Hg occurred in both the systolic and diastolic blood pressures above the basal levels. In addition, they also assessed a test result as indicating hyperreaction if the ceiling value for the systolic blood pressure exceeded 145 mm. Hg and the diastolic pressure exceeded 100 mm. Hg, even if the difference between the basal and ceiling values was less than 30 mm. Hg.

In the present study, a series of 522 cold pressor tests was performed during 200 pregnancies. All tests gave normal results in 84 instances, hyperreaction occurred in one test only on each of 31 patients and in more than one test on each of 85 patients. Only 13 of the patients all of whose cold pressor tests gave normal results, developed hypertension in the later stages of pregnancy. In 4 of these cases the hypertension was associated with preeclampsia. Half those patients, only one of whose tests gave a hyperreactive result, had a normal pregnancy; the other half developed either hypertensive toxemia or preeclampsia. When mild hyperreaction occurred on more than one occasion, 26 of the 85 patients had a normal pregnancy, but 49 developed hypertensive toxemia and 10 had preeclampsia.

Among the 71 apparently normal patients with repeated normal response to the cold pressor test, the basal blood pressure of 26 was raised at delivery, and

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nancy are of value to the obstetrician, since, even if only one response in the series is of hyperreactive type, 50 per cent of the patients giving such responses develop hypertensive or preeclamptic toxemia. When 2 or more abnormal results are obtained, the number of patients who develop such toxemia increases to nearly 70 per cent. On the other hand, toxemia occurs later in pregnancy in only a few cases in which the response to the test is always normal.

Follow-up tests 2 and 12 months after delivery are sometimes helpful in assessing the prognosis of subsequent pregnancies, since patients who have hypertension or are likely to develop it can be differentiated from those unlikely to have this complication. 5 figures.

## PLASMA ANGIOTONASE CONCENTRATION IN NORMAL AND TOXEMIC PREGNANCIES

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Am. J. M. Sc., 213, 715-718, 1947

Theoretically the elevation of blood pressure in eclamptic hypertension is of humorally mediated chemical origin. The renal pressor system is used to describe the biochemical reactions involved, namely, Renin (Enzyme from kidney) + Renin Substrate (Globulin from the liver) forms Angiotonin (Active polypeptide). This is destroyed by Angiotonase (Free enzyme in plasma). If the angiotonase "deficiency theory" accounted for the hypertension of eclampsia a consistently lowered plasma angiotonase activity could be demonstrated.

In this study the plasma concentrations of angiotonase were measured in 10 normal nonpregnant subjects, 16 women with normal pregnancies, 5 patients with pre-eclampsia and 5 cases of eclampsia. A 4 to 10 fold increase in plasma angiotonase concentration was present in the second half of normal pregnancy. A rapid return to normal (1.4 units enzyme activity per cc.) occurred after delivery. The same high levels were noted in fetal cord plasma. In the 10 cases of preeclampsia and eclampsia 4 had low values in comparison to normal pregnancy but still above the nonpregnant level. The two most severe cases of eclampsia had the highest and the lowest values respectively. There was no correlation between the degree of hypertension and the plasma angiotonase. These findings strongly suggest that a deficiency of angiotonase is not the cause of eclamptic hypertension.

15 of these gave a hyperreactive response 2 months later. Abnormal results were obtained on more than one occasion from 27 patients whose pregnancy appeared normal, and the basal blood pressure of 20 of these was raised at delivery. Of these, 16 were retested 2 months later and 13 gave a hyperreactive response.

Among 67 patients who developed hypertension during pregnancy and 19 who developed preeclampsia, only 9 of the first group and 4 of the second gave normal response to cold pressor tests.

Persistent mild hyperreaction during pregnancy was usually associated with raised basal blood pressure at delivery and hyperreaction 2 months later. Of the patients clinically classified as hypertensive who were tested 2 months postpartum,  $\frac{3}{4}$  still had either a raised basal pressure or gave an abnormal response to the test. The basal blood pressure was raised at delivery in all but 2 of the 22 preeclampsia patients, but had dropped to normal in 12 of the 15 patients investigated 2 months later. Hyperreaction to the cold stimulus was still obtained from 6 of these 12 patients. It was found that after normal pregnancies in which all tests produced normal responses,  $\frac{1}{3}$  of the patients gave a hyperreactive response 2 months postpartum.

A group of 506 patients on whom no cold pressor tests were performed during pregnancy were investigated 2 months postpartum. The findings were as follows:

1. In 126 cases the basal blood pressure was at least 150 mm. Hg; no further evidence was necessary to demonstrate the existence of hypertension.

2. In 163 patients the basal systolic pressure ranged from 130 to 150 mm. Hg and the ceiling systolic and diastolic pressures exceeded 145 and 100 mm. Hg, respectively. The test was thus useful in confirming the presence of hypertension in borderline cases.

3. In 217 cases the basal pressure was normal, but the difference between basal and ceiling pressures was abnormal with the ceiling figures exceeding 145 and 100 mm. Hg, respectively. These patients were potential hypertensives.

An abnormal response followed normal pregnancy in 12 per cent of this group and 36 per cent when the patients had had mild toxemia. After preeclampsia and eclampsia more than 50 per cent of cases had evidence of hypertension, 11 per cent still had a basal systolic pressure above 150 mm. Hg and 44 per cent gave an abnormal response to the cold pressor test. Of those with hypertensive toxemia, 68 per cent either had raised basal systolic pressure or gave an excessive response to the cold pressor test.

Assessment of the test 2 and 12 months after delivery showed that there is a high incidence of hyperreaction 12 months after pregnancy complicated by toxemia or hypertension. In the types of pregnancy studied, many women were either normal reactors or hyperreactors both 2 and 12 months postpartum, but about  $\frac{1}{3}$  of the total number who gave a hyperreaction at 2 months were apparently normal reactors at 12 months. More than half of those who were hyperreactive both at 2 and 12 months postpartum showed a rise in basal blood pressure only in the last few weeks of their pregnancy.

The writers conclude that the results of serial cold pressor tests during preg-

admission to the hospital was 110/78, and the urine showed no albumin. A low-lying placenta was suspected, but expectant treatment followed. On Nov. 9 she showed a gain of  $5\frac{1}{2}$  pounds for the preceding 2 weeks, slight edema and a rise in diastolic blood pressure from 60 to 80, but no albuminuria. On Nov. 22 the blood pressure was 120/90 and the urine showed a light cloud of albumin. Labor was induced on Nov. 25, by castor oil and quinine, and after an 8-hour labor, a normal delivery occurred. Low implantation of the placenta was indicated.

A catheterized specimen of urine boiled almost solid with heat and dilute acetic acid. The sediment showed numerous coarsely and finely granular casts. Retinal examination on the second postpartum day showed many sharp and spindle-shaped arterial spasms. On Jan. 11, 1940, the blood pressure was 135/85, and the urine showed a faint trace of albumin.

A thrombosed vein was seen on the fetal surface of the placenta, extending centrally to the cord from its origin near the periphery of the placenta. A broad area of acute infarction was present where the thrombosed vein emerged from the placenta. Examination of the placenta after fixation showed massive acute infarction of the "E" type, and also a "C" type of infarction.

Microscopically, the "E" type of infarction showed congestion and engorgement of the villous capillaries and early necrosis of the stroma, Langhan's, and syncytial layers of the villi. The intervillous spaces showed no thrombosis and were freely open and communicating. The "C" type of infarction showed partial thrombosis of the intervillous spaces, but not sufficient to block completely the intervillous circulation. The villi showed a slight hyalinized stage of degeneration, which is slower and characterized by very mild, if any, toxemia.

On the basis of previous experience in the correlation of toxemia and placental infarction, the author states that it appears that the "C" infarct in this case accounted for the mild evidence of toxemia between Nov. 9 and 22. The subsequent extensive "E" infarction accounted for the fulminating pre-eclamptic condition with rapid increase in albuminuria. Had labor not been induced, it is almost certain that the patient would have developed eclampsia or separation of the placenta.

It is suggested that the presence of sphincters in the collecting veins of the placenta and the possibility of spasm involving the sphincters in one or more veins may well be the beginning of a chain of events leading to toxemia of pregnancy. Evidence of such sphincters may be seen in Fig. 32, page 26, of DeLee-Greenhill's *Obstetrics*, Eighth Edition. The case presented in this paper and the associated pathologic findings strongly suggest the following sequence of events leading to toxemia of pregnancy:

1. Overstimulation of the muscular sphincters of the collecting placental veins, through overaction of, or failure to hold in abeyance an unidentified hormone or internal secretion.
2. Obstruction of the venous return from the dependent placental villi.
3. Distention, engorgement, and rupture of villous capillaries.
4. Stagnation of villous circulation, thrombosis, necrosis, and disintegration of the affected villi.

## RENAL FILTRATION RATES IN PREGNANCY TOXEMIA

INULIN AND EXOGENOUS CREATININE

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Am. J. M. Sc., 213, 709-714, 1947

Glomerular filtration rates were studied in 15 patients, 8 of whom were pre-eclamptics, 4 hypertensives, 2 normals, and 1 nonpregnant patient with hypertension. Three tests were used simultaneously, inulin, exogenous creatinine and urea clearance with the following results. (1) Urinary output under a controlled fluid intake ante- and postpartum showed a marked improvement postpartum. (2) Urea clearance values in general parallel those of inulin and exogenous creatinine, (56 to 92 per cent for pre-eclampsia, 81 and 77 per cent for hypertension, 102 and 125 per cent for normal pregnancy). (3) Exogenous creatinine clearance rate exceeded that for inulin. Its use as a method for the measurement of glomerular filtration rates is invalid, probably because it is excreted by the renal tubules. (4) Inulin clearance rates antepartum are low, improve markedly postpartum and in general indicate interference with glomerular filtration in pre-eclampsia. (Normal filtration rates are  $116 \pm 17$  antepartum and  $139 \pm 16$  postpartum; in pre-eclampsia the mean value antepartum was 84; postpartum 161.) The dramatic improvement in postpartum filtration rates is the chief phenomenon demonstrated by this method.

In severe cases with oliguria or anuria, these clearance test methods of investigation kidney function are not accurate or are too difficult to employ. Additional evidence is necessary to determine the exact mechanism of oliguria and anuria in severe pre-eclampsia.

## THE POSSIBLE ETIOLOGIC SIGNIFICANCE OF THROMBOSIS OF A PLACENTAL VEIN ON THE MECHANISM OF PLACENTAL INFARCTION AND ASSOCIATED TOXEMIA OF PREGNANCY

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Am. J. Obst. &amp; Gynec., 53: 650-657, 1947

The case is reported of a 28-year-old gravida i, whose expected date of confinement was Nov. 16, 1939. Pregnancy was normal until Oct. 20, when there occurred a painless sudden discharge of bright red blood. The blood pressure on

sure was 200, and the lowest 70. The patient with the systolic pressure of 290 and the one with the diastolic pressure of 200 made a good recovery.

Eclampsia occurred as follows: antepartum, 72.5 per cent; intrapartum, 17.7 per cent; and postpartum, 9.6 per cent. Of the 62 patients, 55 of them were delivered of 58 babies, 6 patients died undelivered and one was delivered elsewhere.

The fetal mortality was 37.7 per cent. If 4 infants are included who died between 11 hours and 6 days following delivery, the fetal mortality would rise to 44.2 per cent.

The maternal mortality in this series of 62 cases of eclampsia was 10, or 16.1 per cent. Fifty per cent of the fatalities occurred during the year 1928. Since 1942 there has not occurred a single death from eclampsia, and in 1945 there did not occur a single case of eclampsia. All the fatal cases were without adequate prenatal care. The mortality was over  $2\frac{1}{4}$  times as great in the patients who had no prenatal care as compared with those who had inadequate prenatal care. 4 figures.

## ECLAMPSIA AND FRACTURE OF THE VERTEBRAL COLUMN

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*Acta Obstet. et Gynecol.*, 27, 297-300, 1947

It is well known that fracture of the vertebral column occurs frequently after an artificially induced attack of convulsions. These vertebral fractures vary from the mildest with only a slight compression of the upper compact layer, through the medium strong compressions with wedge-formed vertebral bodies to the most extreme types with a perfectly flat vertebra. The fracture is usually located in the middle or upper portion of the thoracic column. Of 48 roentgenologically demonstrated vertebral fractures after shock, 44 were found in the thoracic region, 1 in the lumbar region, 3 in the caput femoris and humeri. Of these 29 were moderate and slight, 15 more severe. In the course of the short duration of the clonic and tonic cramps, the anterior corners of the corpora vertebrae are forced toward each other as a result of the extreme forward bending.

It is known that other types of convulsions may also lead to vertebral fractures, for instance, those due to tetanus. That eclampsia may also result in such a fracture seems to be illustrated by the following case:

Primipara, aged 28. No previous injuries. No dietary insufficiency. Edema of the ankles during the last 3 weeks of pregnancy. No albuminuria. Normal vision. Normal blood pressure. Admitted to a private maternity hospital where, 2 hours after a normal labor of 10 hours' duration, she had an eclamptic attack and lost consciousness. She was transferred to Drammen Hospital in an

5. Autolysis of the necrotic villi with dissemination of poisonous protein split-products into the maternal circulation, probably peptone histamine and guanidine.

6. Widespread damage to maternal tissues, particularly to the liver and kidneys, toxemia of pregnancy.

7. Eclamptic convulsions, due probably to hyperguanidinemia, or hemorrhagic manifestations as abruptio or ablatio placentae according to the degree of liver damage and the effect on the mechanism of coagulation of the blood. 5 figures.

## AN ANALYTICAL SURVEY OF ECLAMPSIA

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*Am. J. Obst. & Gynec., 53: 972-979, 1947*

This survey included a series of 62 cases of eclampsia which occurred from January, 1927, to December, 1945. During that period, 14,374 cases were delivered, the percentage of eclamptic patients being 0.43 per cent, or 1 eclamptic in 231.8 delivered patients. The study merely substantiates the conclusions arrived at from other similar studies that prophylaxis, education and adequate prenatal care is the answer to the control and prevention of eclampsia.

In the first 5 years, 1927 to 1931, inclusive, there occurred 20 cases of eclampsia in 3,223 delivered patients for a percentage of 0.62, while the number of eclamptics for the last 5 years, 1941 to 1945, inclusive, was 17 in 4,223 delivered patients, for a percentage of 0.40. In the first 5 years the frequency was one eclamptic in 161.1 delivered cases, while in the last 5 years there occurred one eclamptic case in 248.4 delivered cases, showing a decrease.

Practically half of these cases of eclampsia occurred between the ages of 15 and 20 years (46.7 per cent). Eighty-three and eight-tenths per cent occurred between the ages of 15 and 30 years, and 69.3 per cent between the ages of 15 and 25 years.

Eclampsia occurred in primiparas 41 times and in multiparas 21 times, an approximate ratio of primiparas to multiparas of 2 to 1. It was found that 66.1 per cent of the eclamptics were primiparas.

It was found that 56.4 per cent of the series were Negroes, and 43.5 per cent were white. According to seasons, the frequency of occurrence was as follows: summer, 33.8 per cent; autumn, 22.5 per cent; winter, 25.8 per cent; and spring, 17.7 per cent.

Hypertension, edema, edema associated with rapid gain in weight, and albuminuria occurred in 100 per cent of cases. The highest recorded systolic blood pressure was 290, the lowest systolic pressure 140. The highest diastolic pres-

pregnancy tumor is entertained. If ova are extruded from all 3 groups of frogs the clinical presence of chorionic tumor is practically absolute.

To date the authors have performed 31 tests to differentiate pregnancy from hydatidiform mole. The diluted urines from 6 cases caused extrusion of ova and each patient was found to have a hydatidiform mole. Twenty-five cases showed no response with diluted urines. In these 25 cases there was no evidence of chorionic tumor.

## REPORT OF TWO UNUSUAL CASES OF HYDATID MOLE

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M. J. Australia, 1, 434-435, 1947

Two cases of hydatid mole are presented, which are unusual because of the comparatively advanced ages of the patients.

The first patient was aged 55 years and 4 months (verified by Registrar-General's Department). She had 6 children; the last delivery, at the age of 43 years, had resulted in twins. The menses had been normal until 5 months prior to admission, when "flooding" occurred at 2 successive periods which were followed by a normal and then a missed period. For the past month she had passed bright red blood daily *per vaginam*. She had suffered from nausea, anorexia and vomiting for 3 weeks.

On examination the blood pressure was 180/100. No abnormality of the urine was found. The uterus was uniformly enlarged, cystic and of the size of an 18 weeks' pregnancy. The cervix and external os were softened and admitted one and one-half fingers. Secretions were expressed from the breast and the areolae looked "active." A diagnosis of pregnancy complicated by threatened abortion and *hyperemesis gravidarum* was made, and with conservative treatment the symptoms gradually abated.

Three days later the cervix was less soft and irregular in consistency; an irregular friable mass was palpated inside the internal os. These findings and the patient's age, raised the question of uterine malignant disease (possibly chorionepithelioma) and a curettage was performed. Placental tissue was obtained, in which vesicular degeneration of chorion was found. After curettage, the uterus decreased in size, toxemic symptoms disappeared and the patient recovered.

A positive Aschheim-Zondek test was obtained one week after curettage; no reactions were obtained at 4, 8 and 12 weeks after discharge. Skiagrams of the chest revealed no signs of metastases.

The second patient, aged 49 years, was admitted with a history of slight dark vaginal discharge for 4 months. She had 2 children, and since the last confine-

ambulance. On admission she was stuporous with crural edema. Later on the same day there was another eclamptic attack of 1 minute's duration. The patient now states that she complained to the nurse the following day of pains between the shoulder blades which troubled her later. She was therefore sent to the Roentgen Department for examination.

General examination revealed nothing.

Vertebral column: Distinct tenderness of the spinal processes of the 5th and 6th thoracic vertebrae. No gibbus. No markedly increased kyphosis. Backward bending slightly inhibited; otherwise normal movements.

Roentgen examination: Body of the 6th thoracic vertebra wedge-shaped. Anterior height 1.5 cm., the above-lying corpus measures 2.2, and that below 2.5 cm. Posteriorly they have the same thickness. The upper compact layer is compressed downward and into the spongiosa. Arched kyphosis but not more than normal.

There can hardly be any doubt that this compression fracture is analogous to the fractures observed after shock and tetanus. Both the localization and the wedge-form indicate that the mechanism may also have been the same.

No previously recorded cases of compression fracture in the vertebral column as a result of eclampsia can be found in the literature, and the case may possibly be of interest, as it calls attention to this complication in connection with eclampsia.

## THE DIAGNOSIS OF HYDATIDIFORM MOLE BY GONADOTROPIC HORMONE ASSAY USING THE SOUTH AFRICAN FROG, *XENOPUS LAEVIS*

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J. Cline. Endocr., 7, 289-292, 1947

The value of this frog as an indicator of pregnancy has already been established. The test is very simple and inexpensive. Concentrates of pregnancy urine (1 cc.) are injected into the frog and after 4 to 12 hours eggs are either laid or not. Accuracy is 99 per cent in the diagnosis of pregnancy.

In this report the frog has been used to differentiate between pregnancy and the tumors of pregnancy with the same rapidity and accuracy. The technique of assay involves the use of 6 frogs, 2 placed in separate tanks. One cc. of undiluted suspected urine is injected in the first 2 frogs, while a 1-10 aqueous dilution is used in the second 2, and a 1-100 dilution in the third 2 frogs. If eggs are extruded from the frogs receiving the 1-10 dilution, the probability of



nancy. Following this, blood loss continued for some days until curettage was performed. Three months later a Friedmann was negative with 2 times 1 cc. of serum.

From November 23 to December 7 there were new losses of blood. On December 10 the uterus had clearly increased in size. Chorionepithelioma was suspected. Three days later the patient was admitted with a diagnosis of uterine chorionepithelioma perforated into the abdominal cavity. At laparotomy, chorionepithelioma was found, but the blood came from a subcapsular hepatic metastasis with hemorrhage having perforated into the peritoneum. Hemostasis was effected, but the patient died 10 days later. Autopsy revealed multiple metastases, especially in the liver, the lungs, etc., but also in the abdominal lymphatic ganglions.

From a clinical point of view, the writer thinks that a uterus which remains enlarged and patulous 3 months after evacuation of a hydatidiform mole gives a large probability of chorionepithelioma if the Friedmann remains positive. This is all the more probable when metrorrhagia supervenes after a period of amenorrhea.

## THE RELATIONSHIP OF INFERTILITY TO ECTOPIC PREGNANCY

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Dallas M. J., 33, 84-86, 1947

To analyze the relationship of infertility to ectopic pregnancies, 97 extrauterine pregnancies were studied.

The age group with the greatest incidence was from 21 to 32 years. The frequency in the white race was 39 per cent, in the colored 41 per cent. The location of the ectopic pregnancy was usually in the tubes (94 per cent). One case was a bilateral tubal pregnancy, 1 broad ligament pregnancy, 1 ovarian and 4 abdominal pregnancies.

The average interval between the ectopic and the preceding pregnancy was  $4\frac{1}{2}$  years. There was no constant relationship between an ectopic pregnancy and a preceding period of infertility. However, in 50 per cent of the patients with ectopic pregnancies there was a period of infertility from  $2\frac{1}{2}$  months to 19 years.

Two-thirds of the cases had no history of venereal disease. One-third had had either syphilis or gonorrhea. There were 9 repeat tubal pregnancies. The interval between the last normal menstrual period and the onset of symptoms averaged 46 days. Fifty-five per cent of the ectopics were found ruptured at operation. Two patients in this series died, a mortality rate of 2 per cent.

ment, 4 years previously, the menses had been normal until 6 months before admission. During this time there had been continuous, slight dark discharge with some recent hemorrhages of bright red blood and clots. The breasts had been enlarged and there had been morning sickness, but these symptoms had ceased prior to admission.

On examination the blood pressure was 190/100. No abnormalities of urine were found. The uterus was enlarged to the umbilicus, the cervix was small and the external os admitted one finger. No fetal heart sounds were heard. A diagnosis of 5 months' pregnancy with a fetus of doubtful viability was made. Skiagrams of the uterus revealed no fetal bones, and an aschheim-Zondek reaction was obtained; therefore, the diagnosis of hydatid mole was made. In the next few days the uterus rapidly increased in size. Hysterectomy was performed and hydatid mole *in situ* was obtained. Recovery was uneventful.

A discussion of the diagnosis and treatment of hydatid mole is presented. DeLee states that hydatid moles have occurred in women up to 53 years of age. The author notes that although it is often stated to be higher, recent estimation of the true incidence of chorionepithelioma following hydatid mole gives it as not more than 2 per cent.

## CONCERNING TWO CASES OF CHORIONEPITHELIOMA

E. HELD (ST. GALL)

Schweiz. med. Wschr., 77, 246, 1947

The first case reported in this paper concerns a 46-year-old woman, pregnant for 8 months, who was admitted for metrorrhagia. The uterus was the size of a  $4\frac{1}{2}$  to 5 months' pregnancy. The Friedmann-Brouha was positive with 3 times 1 cc. of serum. Radiography demonstrated the absence of a fetus. A second Friedmann gave a positive result with 2 times  $1/120$  cc. of serum. Hydatidiform mole was diagnosed. Gonadotrophic hormone production exceeded 60,000 U.L./1 liter before evacuation of the mole. Three months and one week after evacuation, the serum contained more than 4,000 U.L. of gonadotrophin. As some metrorrhagia continued for more than 4 weeks, a biopsy was done which showed some molar rests with proliferation of epithelial elements. Total hysterectomy resulted in cure.

In the second case, a 27-year-old woman, whose last menstrual period was in February, 1945, was admitted in May, 1945, for fibromyoma with metrorrhagia. A tumor, corresponding to the uterus, extended 2 fingerbreadths from the umbilicus. A cystic, fist-sized formation was found behind the uterus. Hydatidiform mole was suggested. A Friedmann test was positive with 2 times 1 cc. of serum. Five days later the test was negative with 2 times  $1/120$  cc. of serum. Examinations were interrupted by the spontaneous expulsion of a molar preg-

## ABDOMINAL PREGNANCY

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Ohio State M. J., 43, 161-164, 1947

The pathology, diagnosis and treatment of abdominal pregnancy are discussed, and a case report is presented. The correct diagnosis of abdominal pregnancy can be made in a greater percentage of cases if the possibility of this condition is considered in all pregnancies that seem "unusual". The writer lists 10 significant points in the history and physical findings of cases of abdominal pregnancy, which are as follows:

1. History of usual symptoms of early pregnancy (missed period, nausea, etc.).
2. In most cases, not long after the missed period, the patient experienced some bleeding and lower abdominal pain.
3. There usually follows a variable period of freedom from symptoms.
4. Later, abdominal pain is usually present. It may be dull or sharp. Sometimes the baby's movements are especially painful.
5. Vaginal bleeding may occur briefly in early pregnancy and continue intermittently.
6. Softening of the cervix is about the same as in normal pregnancy. The cervix may be displaced, depending on the location of the gestation sac.
7. The fetus is often palpable with unusual ease.
8. The uterus is usually enlarged to the size of a 4 or 6 weeks' pregnancy and is often indistinguishable from the general abdominal mass.
9. X-ray may be of definite value. Soft tissue technique will fail to reveal the uterine shadow around the fetus. On lateral view, the fetus may be seen directly under the abdominal wall. Also, the fetus frequently assumes an abnormal position.
10. Vomiting is a frequent symptom.

Once the diagnosis of abdominal pregnancy is made, it is considered best to operate without delay. Immediate operation prevents the possibility of sudden, severe intra-abdominal hemorrhage due to partial separation of the placenta. It also prevents the formation of more firm and dense adhesions as pregnancy progresses, and the possibility of intra-abdominal sepsis. The frequency of a deformed fetus in abdominal pregnancy makes waiting for viability not worth the risk.

At operation, most writers feel that unless the placenta is free in the peritoneal cavity, or attached only by an easily severed pedicle, it should be left alone. Manual removal of the placenta in this condition results in severe bleeding which may be difficult to control. In the majority of cases, if left alone, absorption of the placenta occurs with no further trouble. If the placenta later becomes infected, the abdomen can be reopened and drained, or the placental mass easily

## FULL-TERM INTRALIGAMENTARY PREGNANCY

I. T. FRASER

Proc. Roy. Soc. Med., 40, 378-379, 1947

The case is reported of a 26-year-old patient, para 0, who was admitted to University College Hospital at 38 weeks' gestation as a case of missed abortion. One week following the last menstrual period there had been slight vaginal bleeding and soon thereafter, right lower abdominal pain. At 11 weeks' gestation, 2 pieces of "membrane" were passed, after which there was a brownish vaginal discharge. At 13 weeks, a Xenopus test was positive. At 22 weeks, the fundus was at the level of the umbilicus, but no fetal movements had been felt and the Xenopus test was negative. At 30 weeks, the fetal heart was not heard and x-ray examination showed the fetus to be in an attitude of extreme flexion; it was thought to be dead.

On the present admission the fundus was 2 in. above the umbilicus. The head was to the left side of the fundus. The fetal heart was unexpectedly heard at a rate of 120. Fetal limbs were easily felt in the posterior fornix. X-ray examination showed an oblique lie of the fetus, with such flexion of the spine that the radiologist was convinced that the fetus was dead. The fetal heart continued to be heard and there was a watery vaginal discharge. An attempt at version was unsuccessful.

On the expected date of delivery the patient had slight lower abdominal pains. Next day the fetal heart had ceased. In the next two weeks 2 medical inductions were unsuccessful. X-ray at 44 weeks' gestation showed marked collapse of the fetal skull. Abdominal pregnancy was considered and examination under anesthesia was carried out at 46 weeks. Fetal limbs could be felt with great ease in the posterior fornix and a dilator passed into the uterus for 5 in.

Laparotomy revealed a left intraligamentary pregnancy, the fetus being contained in an ovisac. The uterus was enlarged and incorporated in its anterior wall. An extension of the sac to the right contained the placenta. The fetus was severely macerated and weighed 4 lb. There was no congenital abnormality. The left ligament was divided and the sac was separated from the uterus and removed. Recovery was uneventful.

In this case, the apparent leakage of liquor, presumed to come from a normal uterus, was partly responsible for delay in diagnosis. However, there were many suggestive features—the history of pain, bleeding and of "membrane" being passed; the fixed malpresentation; non-engagement of the presenting part; and ease of feeling fetal parts vaginally. Had the diagnosis been made earlier, laparotomy before term might have resulted in a living fetus.

In 1937, Champion and Tessitore could find only 70 cases of intraligamentary pregnancy that had proceeded past the 28th week of gestation.

SECONDARY ABDOMINAL PREGNANCY SIMULATING  
OVARIAN CYST

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*Madhubani*

J. Indian M. A., 15, 378, 1946

The points of interest in the case of secondary abdominal pregnancy presented by the author are: (1) No fetal parts could be felt on account of fluid and pulling of the sac by adhesions, obscuring the feel of the head. (2) No definite history could be elicited from the patient who was an illiterate villager.

A 30-year-old Hindu female, para i, was admitted with a lower abdominal tumor of one year's duration. Her general health was poor, with marked anemia. A dull rounded mass occupied the lower abdomen. It extended 2 fingers above the umbilicus and was smooth and cystic. On vaginal examination, a tense cystic mass completely filled the pelvis, continuous with the abdominal mass, and the uterus was felt high up to the right. A diagnosis of ovarian cyst was made and, after the general condition of the patient had been improved, operation was performed.

At operation, a thick tense cystic mass, adherent on all sides, was seen. The uterus and right adnexa were drawn up and covered the fetal head. The sac was freed from its adhesions and was removed entirely, except for a small tear where the uterus was attached. The left adnexa was indistinguishable from the mass. On opening the sac a full grown dead fetus and a placenta were found in a great deal of fluid. The patient recovered.

On close questioning after operation, the patient disclosed that she had missed a period a year ago, and had had acute abdominal pain about 1½ months later. There had been general enlargement of the abdomen with doubtful fetal movements, and pains which simulated labor pains had occurred about 8 months later. Following this, the size of the abdomen remained stationary.

## PLACENTA PRAEVIA

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Practitioner, 159, 15-21, 1947

The changing outlook in the treatment of placenta previa, together with the availability of adequate supplies of blood for transfusion and the advances in chemotherapy have resulted in a considerable improvement in the maternal and fetal mortality rates.

removed at this later date. If frank infection is present at the original operation, drainage or marsupialization should be performed.

The case is presented of a 30-year-old Negress who had had 2 preceding normal pregnancies. When seen at approximately the sixth month of her third pregnancy, her only complaint was irregular periods of lower abdominal pain. There had been some vaginal spotting during the early part of pregnancy. In palpating the abdominal enlargement, one particular orange-sized mass, midway between the pubis and umbilicus, appeared to be a sensitive uterine fibroid such as is not infrequently seen in pregnant fibroid uteri. The cervix was softened and located anteriorly. Posterior to the cervix there was a large, firm nontender mass. X-ray examination revealed this to be the fetal head resting in the posterior portion of the lower uterine segment. Although the possibility of abdominal pregnancy was considered, it was thought that the diagnosis was probably pregnancy in a fibromyomatous uterus. Careful observation was continued.

Two weeks later, while straining at stool; the patient experienced sudden, severe, lancinating, generalized abdominal pain. On admission to the hospital she was suffering excruciating pain. The temperature was 37 degrees C.; pulse, 140; blood pressure, 120/85. The abdomen was exquisitely tender, but only slightly spastic. Pelvic examination revealed the fetal head deep in the pelvis, separated from the examining fingers only by vaginal wall tissue. The cervix was high under the pubis. A diagnosis of abdominal pregnancy with intraperitoneal hemorrhage was made, and operation was immediately performed.

A large amount of liquid and clotted blood was present in the peritoneal cavity. Posteriorly and to the right of the slightly enlarged uterus was the 6 months' gestation sac. This was ruptured artificially and a living fetus was extracted which died in a few hours. The fetus appeared normal. The cord was ligated and cut close to its placental insertion. The bleeding which was noted on opening the peritoneal cavity continued unabated. Its source was found to be a small detached portion of placenta, apparently separated as the patient strained at stool prior to admission. By maintaining pressure on the bleeding area for 4 days with a column of gauze which came through the abdominal wound, the bleeding was controlled. Plasma and blood were administered liberally throughout operation.

The patient improved following operation until, on the fifteenth postoperative day, pulmonary embolism occurred. This resulted in death within one hour. The author feels that if this tragic event had not occurred, it seems safe to predict that the case would have terminated successfully.

though the diagnosis remains in doubt. The institution of more active measures is usually determined by the onset of labor or the occurrence of hemorrhage after the fetus has attained a reasonable size. Vaginal examination is then carried out in the theatre with all preparations made for any procedure, including cesarean section. Choice of treatment depends mainly on the degree of dilatation of the cervix and the location of the placenta in the lower segment. Other factors are age and parity of the mother and sometimes viability of the fetus.

Artificial rupture of the forewaters gives satisfactory results in first degree cases and also in second degree cases provided labor is in progress, the uterus contracting well and the cervix already partly dilated. Cesarean section is the treatment of choice in all cases of third and fourth degree cases of placenta previa, and is usually the best for second degree cases when the patient is not in labor or the cervix is less than 2 fingers dilated. With few exceptions, the lower segment operation is desirable. The real bogey is post-partum hemorrhage from the atonic placental site. Such risk is largely dependent upon the type of anesthesia employed; local analgesia, supplemented, if necessary, with a small dose of sodium pentothal intravenously, is ideal. The risk of third stage and postpartum hemorrhage should be kept in mind during either vaginal or abdominal delivery.

Until about 10 years ago, in the author's country, 5 to 7 per cent of mothers and at least 50 per cent of babies were lost from placenta previa. Recently, Macafee reported only 2 deaths among 616 patients (0.32 per cent). In his own series he was able to reduce the fetal mortality rate to 22 per cent (corrected to 18 per cent) without increasing the maternal risk. However, the author emphasizes that the simplification of treatment and the improvement in results should not be allowed to induce a false sense of security or an attitude of complacency in the medical attendant. 5 figures.

### MARGINAL PLACENTA PREVIA TREATED BY ARTIFICIAL RUPTURE OF THE MEMBRANES THIRTY-NINE DAYS BEFORE VAGINAL DELIVERY

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*Am. J. Obst. & Gynec., 53, 885, 1947*

The writer presents a case of marginal placenta previa, diagnosed at 28 weeks, which was treated by rupture of the membranes. The patient delivered vaginally 39 days later, and the 5 lb., 4 oz. baby lived. The patient was a 35 year-

Browne's classification (1944) of placenta previa has to a large extent superseded the traditional one of central, marginal and lateral types. Browne describes 4 degrees of placenta previa, as follows:

*First degree.*—Placenta partly in the upper and partly in the lower segment, but does not extend down to the internal os.

*Second degree.*—Edge of placenta reaches the internal os but at no time overlaps it.

*Third degree.*—Placenta mainly occupies lower segment, covering internal os when the latter is closed, but not when it is dilated.

*Fourth degree.*—Placenta is distributed so evenly over lower segment and cervix that the latter remains covered even when fully dilated.

The only symptom is uterine hemorrhage, which is typically recurrent. The amount is variable, the bleeding usually comes on suddenly and without provocation, and is characteristically painless, unless the patient happens to be in labor. Placenta previa is probably the cause of many cases of abortion, although its diagnosis in early pregnancy is usually impossible. The physical signs of placenta previa depend upon the fact that the mass in the lower segment tends to displace the presenting part and prevent its engagement. Malpositions are common, and when the fetal head is presenting it remains unusually high above the pelvic brim. If the placenta lies mainly to one or the other side of the lower segment, the head is pushed to the opposite side of the middle line.

The only clinical method of diagnosing placenta previa with certainty is to feel the placenta with a finger inserted through the cervix. On bimanual examination alone, a suggestive but not conclusive sign is the feeling through one or the other fornix of a mass intervening between the fetal head and the examining fingers. However, any intrapelvic examination other than speculum examination of the cervix involves a serious risk and generally should be avoided. The diagnosis can be made with a high degree of accuracy on the history in conjunction with abdominal findings. The placenta can rarely be seen on ordinary skiagrams, but cystography has a place in the diagnosis of placenta previa. The bladder is filled with a radio-opaque fluid, and antero-posterior skiagrams are taken to determine the width and shape of the space between the presenting part and the fundus of the bladder. This space is wider and may be wedge-shaped in cases of placenta previa. Cystograms are only useful after the 36th week of pregnancy and when the head is presenting.

Emergency treatment at home should be regarded as "first-aid" only, vaginal and rectal examinations should be avoided at all costs, and the patient should be transferred to hospital as soon as her condition permits. Heavy blood loss calls for transfusion before transfer. On admission, the blood group and hemoglobin level are determined, the abdomen is carefully examined and toxemia of pregnancy and cardio-renal disease are excluded by routine tests. If the patient is not in labor or approaching term, every effort is then made to postpone active intervention until the fetus is sufficiently developed for the best chance of survival. With the help of blood transfusion, the patient can often be tided over several bleeding episodes. Vaginal digital examination is still deferred even



March she developed an arrhythmia which persisted until term, but electrocardiograms showed only premature ventricular contractions, and little significance was given them. In June, approximately one month before term, the blood pressure began to increase slowly to 170-185/100-110. Customary measures were begun and there was no further increase in pressure. On July 12, medical induction of labor was attempted, but failed.

On July 22, the patient's blood pressure was 200/120 and she had a severe upper respiratory infection. She was admitted to the hospital immediately, was sedated and the respiratory infection was treated, preparatory to induction. Her pressure decreased to about 160-170/100 as the infection gradually improved. On the third hospital day she went into spontaneous labor. She received nembutal and paraldehyde, and the labor lasted less than 10 hours.

During labor, the arm pressure ran as high as 230/130 and the leg pressure 140/100, but there were no sequelae. Delivery was by elective low forceps and episiotomy under gas, oxygen, ether anesthesia. A normal 6 lb., 9 oz. male was delivered. The postpartum course was entirely asymptomatic, with a gradual lowering of the pressure to 150/90. She was discharged entirely symptom-free.

## THE EFFECT OF DIPHTHERIA ON PREGNANCY, WITH A REPORT OF FIVE CASES

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Am. J. Obst. & Gynec., 53, 1029-1035, 1947

These writers present a review of the literature of diphtheria in pregnancy, and report 5 cases occurring in various stages of pregnancy. From these cases there is no indication that adequately treated diphtheria increases the incidence of abortion or premature labor. These 5 cases represent the total number of patients with diphtheria in pregnancy seen in the Obstetrical Clinic of the Johns Hopkins Hospital in the past 50 years, during which time there occurred more than 50,000 deliveries.

Ollier, in 1904, stated that pregnancy did not predispose to or aggravate diphtheria and that labor was also innocuous. Berkeley, Bonney and MacLeod state that pregnancy accentuates diphtheria, causes more laryngeal involvement and results in a high maternal mortality rate in the absence of antitoxin therapy. Halban and Seitz, and DeLee and Greenhill cite an abortion rate of 33 per cent, attributed to the effects of the toxic and respiratory disturbances. There is no evidence that diphtheria produces congenital anomalies analogous to those produced by virus diseases such as German measles.

old multipara who began to have intermittent vaginal bleeding at about the twenty-first week of pregnancy. Bed rest relieved this until, at the twenty-eighth week, after two weeks in bed, profuse vaginal bleeding occurred. On admission to the hospital, the vertex was presenting and dipping into the pelvis. The cervix was moderately thick but admitted one finger. A marginal placenta previa was noted. Because of the unlikelihood of the baby surviving, the location of the placenta and the condition of the cervix, it was considered advisable to rupture the membranes. Two doses of infundin (one minim each) produced mild cramps and controlled bleeding. When, 24 hours later, the patient had not gone into labor, castor oil was given. No labor resulted. Penicillin was given prophylactically, and was stopped after 2 afebrile weeks. During the 39 days following rupture of her membranes, the patient continued to leak amniotic fluid. There were 4 episodes of slight bleeding, controlled with infundin. Transfusions and iron by mouth were used to support the blood level. She had an easy 2 hour and 30 minute labor.

## PREGNANCY COMPLICATED BY COARCTATION OF THE AORTA

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*Am. J. Obst. & Gynec.*, 53, 1054-1056, 1947

Mendelson regards coarctation of the aorta as an exceedingly grave complication of pregnancy, and advises termination of pregnancy if the patient is seen in the early months and close observation, cesarean section and sterilization if she is seen when gestation is more advanced. Hamilton, Walker, Eastman and others believe that certain of these patients can, under close observation, be carried to full term and delivered normally.

In view of the rarity of this complication and the question of therapeutic abortion, the author reports a case of coarctation of the aorta complicating the first pregnancy of a 21-year-old patient. She was seen in January, 1946, with a history of hypertension and previous x-ray picture typical of coarctation. The patient had only one functioning kidney. She was approximately 14 weeks' pregnant and was admitted to the hospital for study.

There was no dyspnea or cyanosis. The eye grounds were normal. Blood pressure in both arms was 155/80; in the right leg it was 115/60, and in the left leg, 120/65. The heart was of normal size with regular rhythm. There was a soft substernal systolic murmur. The pelvis was adequate. A chest plate confirmed the diagnosis of coarctation.

It was felt that the patient could go to term, but not without some risk. This she willingly accepted. For the next 2 months the course was benign. In

# PATHOLOGY OF LABOR AND PUERPERIUM

## CENTRAL RUPTURE OF THE PERINEUM

### A REPORT OF A CASE WITH A REVIEW OF THE LITERATURE

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J. Obst. & Gynaec. Brit. Emp., 54, 351-357, 1947

Mrs. D. S. was aged 30. Her first child had been delivered in her own home in 1938. There had been a perineal tear, described by the patient as an "internal tear," which was sutured. Her height was 4 feet 11 $\frac{7}{8}$  inches. Clinical and radiological pelvimetry showed the pelvis to be adequate.

Her second pregnancy was uneventful and she went into labor 7 days after the expected date of delivery. She was admitted to the labor ward of University College Hospital on January 29th, 1946. The first stage of labor lasted 3 hours. A vaginal examination was about to be made when the patient suddenly screamed that the baby was coming. The membranes ruptured and the child's head was seen to be distending the left labium majus. An attempt was made to push the head towards the midline, but this was unsuccessful, owing partly to the strong bearing-down efforts made by the patient. Almost immediately the skin of the labium and the perineum split in several places and a few seconds later the head burst through the skin and was born. The rest of the child followed quickly. The infant was a female, weighing 7 pounds 1 $\frac{1}{2}$  ounces and was in good condition with only slight head molding. The length of the child was 20 inches, head circumference 12 $\frac{1}{2}$  inches, occipito-frontal diameter 5 inches, biparietal diameter 4 inches.

The diagram (Fig. 1) shows the appearance after delivery of the child, with the umbilical cord passing through the tear. There was complete continuity at the posterior commissure and all round the margins of the vaginal aperture. The fingers could easily be passed through the wound into the vagina, so that the left labium majus lay across the palm of the hand, bridging the gap, and apparently attached only at its anterior and posterior ends. There were also numerous superficial tears of the skin of the vulva and the vaginal mucous membrane was extensively lacerated, especially on the left lateral wall.

The placenta and membranes were delivered 15 minutes after the birth of the child, through the aperture in the vaginal wall and perineum. There was no uterine hemorrhage though bleeding from the tear became obvious 1 hour later. The patient did not complain of pain and was surprised to hear that she would have to have stitches inserted.

An injection of papaveretum ("omnupon") and scopolamine was given and an hour later the patient was taken to the operating theater. She was placed in

Brescia emphasizes that only infants born of mothers who are immune to diphtheria are themselves immune. Infants of these mothers give a negative Schick test in 100 per cent of cases. At 6 months 80 per cent have become positive. Infants born of nonimmune mothers show 50 per cent positive Schick reactions, and after 4 months are 100 per cent Schick positive.

In the cases reported by the authors, pregnancy did not seem to alter the course of the disease in any way, nor did the disease appear to alter the course or the outcome of the pregnancy. Such cases should be treated in manner similar to diphtheria in nonpregnant individuals. Antitoxin is the single most important therapeutic agent. Secondary infections can be controlled by chemotherapy and antibiotics. Myocarditis, of course, should be treated by bed rest. No interruption of pregnancy was observed in the authors' cases, and none of them showed any premonitory signs of miscarriage.

No evidence was found in the literature, nor was any obtained from these cases, that might indicate the passage of diphtheria toxin across the placental barrier.

*Pseudomonas pyocyaneus* was grown. Ultraviolet light was given to the perineum twice daily.

On the 14th day it was found on examination that the posterior wall was healed and intact. The perineum had broken down superficially and was gaping slightly but granulating well. It was decided to continue treatment for 3 or 4 days and then to consider resuture. One week later the perineum was almost healed. Resuture was considered unnecessary and the patient was discharged.

*Postnatal.* The patient attended the postnatal clinic when the child was 5 weeks old. The perineum was almost healed, but slightly deficient. There was no cystocele or rectocele.

One month later healing was complete.

The most complete review of the literature of the subject up to the year 1878 was given by Reeve (*Trans. Amer. gynec. Soc.*, 3, 45, 1878). This author was able to collect 35 cases from the literature. He gives details of a personal case where he was summoned to a patient who had been delivered of her 3rd child by a midwife. He found an enormous laceration of the perineum, which had divided both sphincters of the anus, but had left the posterior vaginal commissure intact and as thick as a man's thumb. This laceration was repaired with silver wire sutures, but it broke down, and a rectovaginal fistula remained. An attempt to cure this one year later was unsuccessful.

Sachs (*Zbl. Gynäk.*, 50, 1326, 1926), while not describing any cases, discussed the mechanism of production of central rupture of the perineum. The condition occurs either in nulliparae or in cases where there has been a previous tear of the perineum or an operation. Delivery is sometimes protracted, sometimes precipitate. In one variety the tissues are rigid, a crack occurs in the perineum and the child escapes through the eventual central laceration. Here labor may be long. In a second variety precipitate delivery takes place and the force of the contractions drives the child through the perineum. In a third variety the child's head escapes out of the vagina into the fascial space surrounding it and eventually bursts through the skin of the perineum or the surrounding structures.

Sachs quotes the opinion of Angemeister who suggested that in these cases the perineum is elongated and the frenulum lies far forward. The vaginal introitus is not in line with the descent of the head which comes to lie on the perineum rather than on the vaginal walls. Over-stretching of the vagina in the long axis and rigidity of the soft parts are contributing factors.

Kovacs (*Zbl. Gynäk.*, 66, 23, 1942) described the condition as "paracentral tear of the perineum" and quoted theories of the causation of the condition from various authorities. He mentions von Bigelow, Klein and Stoeckel as ascribing the condition to the fact that in these cases the perineum is too high. According to von Münster and Mandelstamm a narrow outlet is responsible. Stortfeld and Mathei ascribe the condition to a scarred condition of the perineum and Fergusson and Seidentopf to rigidity from previous tears. Kovacs suggests that these various factors may all play a part. In a series of 16,000 births collected over 10 years, central rupture of the perineum occurred on only 4 occasions, an incidence of 1 in 4,000 labors. The mechanism suggested by Kovacs is that the fetal head comes to lie in the rectovaginal space and bursts out of it through

the lithotomy position and the tissues of the perineum and lower half of the vagina were infiltrated with procaine 0.5 per cent, and adrenaline 1:200,000. The extent of the tear was now carefully examined. It was found that a laceration extended through the skin of the perineum and outer border of the left labium majus along almost the whole of its length. The tear in the vagina was surrounded by much scar tissue and the tissues were extremely friable. The tear extended up the left lateral wall of the vagina almost to the cervix and there were several secondary lacerations in the posterior vaginal wall. There was no significant laceration of the cervix. The perineal body was intact but the left levator ani had been torn through. The rectum and anal canal were intact.

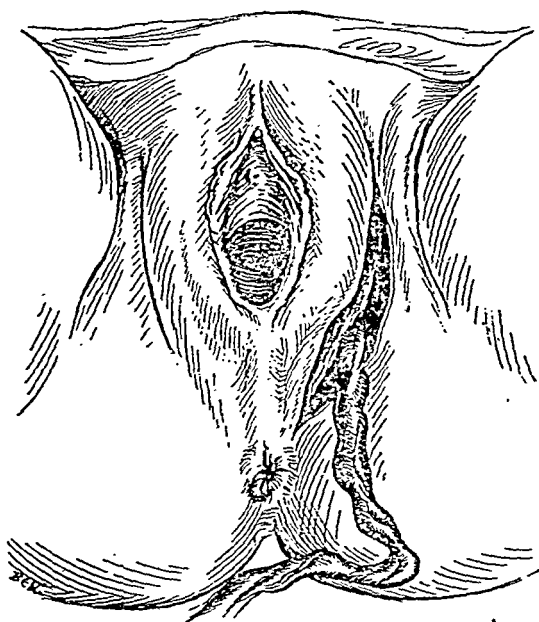


FIG. 1. ILLUSTRATING THE VULVA AND PERINEUM AFTER CENTRAL RUPTURE OF THE PERINEUM. (COURTESY OF DR. JOSEPHINE BARNES.)

*Procedure.* The remains of the left labium majus which were bridging the passage between the tear and the vagina were incised for better access. The torn edges of the vaginal wall were brought together with interrupted catgut sutures, after excising as much of the scar tissue as possible. The left levator ani was repaired and the left labium majus was reconstructed. The perineal skin was united. The whole procedure was rendered difficult by the extreme friability of the tissues. The local analgesia was entirely sufficient for the whole procedure. The patient did not complain of pain and seemed unaware of the examination or the insertion of the sutures.

*Puerperium.* This proceeded uneventfully, except that the superficial part of the tear broke down and became slightly septic. A swab was taken and

A 22-year old para i, gravida ii, was first seen when she was one month from term. Her first delivery had been by cesarean section, the indications being "a difficult, prolonged labor, poor progress, a head in transverse arrest, and failure of the cervix to dilate satisfactorily after thirty-six hours of labor." The present pregnancy progressed normally, the fetus was in left occipito-anterior position and was thought to be normal in size, and no cephalopelvic disproportion was apparent. Therefore, a trial of labor was decided upon.

When admitted in labor, the patient was having uterine contractions every 4 minutes, the membranes were intact, the cervix was undilated and unengaged and the head was dipping into the pelvis but was unengaged. After 8 hours of labor the cervix was still undilated. After 14 hours of labor the membranes ruptured spontaneously and the head was at the spines. After 15 hours the cervix was 3.5 cm. dilated and a small but continuous flow of blood appeared at the vulva. After 22½ hours' labor, rectal examination revealed a fleshy mass in front of the head, the latter having descended well below the spines. At vaginal examination the mass was recognized as a detached annular portion of the cervix, complete except for a 2.5 cm. tag of tissue at about 11 o'clock. After 23 hours of labor the patient was delivered of a normal 3,300 Gm. female infant. The tag of cervix was clamped, cut and tied. Seven hundred and fifty cc. of blood loss was collected in the delivery room, and the estimated loss prior to delivery was 350 cc., making a total of 1,100 cc. of blood loss during labor.

Nineteen days postpartum, a small rim of vaginal cervical tissue was present, with a tag about 4 mm. long on the patient's left. At 14 weeks postpartum, the external os was rigid and small. The pathologic diagnosis was acute congestion, hemorrhage, and edema of cervix uteri, with spontaneous amputation of the pars vaginalis.

The writers present an analysis of the already reported cases. Seventy-five per cent of the cases occurred in primiparas, the average age being 31 years. The average length of labor in 41 cases was 58 hours. In at least 48 per cent of cases early rupture of the membranes occurred. In only 6 instances was "normal pelvis" definitely stated. In 14 cases, or over 25 per cent, cephalopelvic disproportion existed. The average weight of the babies in 21 cases was 3,414 Gm. There were 53 vertex and 2 breech presentations. In 5 cases annular detachment of the cervix accompanied the use of an intrauterine hydrostatic bag. Seventeen authors noted a "rigid cervix" to palpation during the first stage of labor. There were 4 maternal deaths, all following infection. Postpartum bleeding occurred in 8 cases; the bleeding, seemingly, did not always arise from the cervix, but was secondary to uterine atony. Sixteen stillborn infants were reported, a primary fetal mortality of 29 per cent.

It is concluded that the basic causes for annular detachment of the cervix during labor are an unyielding cervix, disproportion, and a faulty mechanism of labor. The disproportion, with faulty mechanism of labor, the authors believe may cause secondary changes in the cervix, rendering it inelastic. With impingement of the cervical tissue between the fetal head and the bony pelvis,

the perineum. He suggested a congenital origin and illustrates 2 sites where congenital weaknesses of the pelvic floor may exist: one anteriorly in the triangle formed by the bulbo-cavernosus, ischio-cavernosus and transversus perinei, and the other posteriorly, behind the transversus perinei, and in the triangle formed by it with the levator ani and gluteus maximus. An illustration is given of the latter type of pelvic hernia occurring in a woman of 30. Kovacs believes that these herniae are of atavistic origin, resulting in a congenital weakness of the pelvic fasciae and muscles.

The mechanism by which the child and placenta escaped through a rent in the posterior vaginal wall and perineum seems to be fairly easily explained in the case which has been described. Little is known about the patient's first confinement, but she was confined in her own home, was told that she had had an internal tear, and sutures were inserted by a midwife. It seems likely that these sutures were inserted through the skin only and that scarring resulted in the perineal area with a weakness in the lower part of the posterior vaginal wall. In the 2nd labor, delivery could be described as precipitate. As the head came down on to the perineal body, the rigidity of the previously sutured area prevented the usual distention of the vulval orifice. The weak area in the posterior vaginal wall gave way, and the child's head came to lie in the fascial space posterior and lateral to the vagina. The force of the uterine contractions then drove the head through the skin of the perineum and that overlying the left labium majus. The child emerged very much to the left side, and it is possible that a congenital hernia or weakness of the pelvic floor, as described by Kovacs, was present in this case.

Radiological examination of the pelvis did not reveal any evidence of contraction of inlet or outlet nor any abnormal configuration of the sacrum. Pelvic contraction does not seem to have been a predisposing factor in this case. It is concluded that when such laceration is threatened, episiotomy should be performed without delay.

(Dr. Barnes' extensive and presumably complete review of the literature on central rupture of the perineum indicates that no example of this rare accident has been reported in the American literature during the present century. It has hence seemed justifiable, with Dr. Barnes' permission, to transcribe her case report verbatim and to digest her admirable review of the literature at some length.—Ed.)

## SPONTANEOUS ANNULAR DETACHMENT OF THE CERVIX DURING LABOR

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*Am. J. Obst. & Gynec., 53: 873-877, 1947*

In a thorough search of the literature, the authors have been able to find but 54 reported cases of annular detachment of the cervix as a complication of labor. They report an additional case of their own.



technique with slight traction on the cord once the placenta is in the vagina. If one waits too long, the muscular portion of the uterus may contract about a portion of the placenta and make the expression difficult. If this happens the placenta which is almost always protruding into the upper vagina, can be grasped with the sterile-gloved hand and gently extracted. All placentae are removed manually if necessary at the end of one hour maximum and usually within 15 minutes. If there is hemorrhage the placenta is expressed or removed manually at once. If the placenta has been delivered intact and yet bleeding still continues from the uterus, the following treatment is indicated: Repeat the intravenous injection of ergotrate or pituitrin, explore the uterus manually for an accessory lobe and to exclude rupture, briskly massage the uterus through the abdominal wall, pack the uterus if bleeding continues despite the other 3 precautionary measures. This systematic treatment will control uterine bleeding from atony in almost 100 per cent of the cases. During and after the hemorrhage the patient must be given blood in amounts more than sufficient to replace what was lost.

## PUERPERAL INVERSION OF THE UTERUS

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Harper Hospital Bulletin, 5, 86-89, 1947

Because individual experience with this condition is inadequate for drawing helpful conclusions, the author has collected a series of 22 cases observed during a period of 16 years, all but 2 of which were managed by general practitioners until the condition became critical. In nearly all cases there was a history of aggressive management of the third stage, with inaccurate estimation and appreciation of the attendant blood loss. This is particularly prominent in the fatal cases where exsanguination and shock caused death.

In the group studied, the ages ranged from 17 to 33 years. Fourteen were primiparae and 8 multiparae. Eighteen were spontaneous deliveries, 3 were delivered by low forceps, and 1 was a breech extraction. Fifteen were anterior positions, 2 posterior, 1 a breech and 4 were not recorded. In 19 of the patients there was hemorrhage, the blood loss in 3 being considered normal. Eighteen patients out of the 22 went into shock. The third stage was apparently of normal duration in 13, prolonged in 5, and unrecorded in 4. In 2 of the 5 prolonged cases manual removal of the placenta was done. Both of these patients died. Of 10 patients in whom the diagnosis was made at once, 2 died. In 9 the diagnosis was delayed from one half to 6 hours, 4 of these died. In 2 other cases, the condition was not recognized until 7 to 14 days after the delivery. Both recovered after manual replacement. It is significant that 14 of the 22 were primiparae and that in 1 case the condition recurred at the next delivery. This suggests a congenital

congestion, leucocytic infiltration and edema occur. The cervix develops a circular line of cleavage and is torn away at its cervicovaginal junctiva.

The high fetal mortality is due to the long labors and the small pelves, not to cervical detachment per se.

Four women had successful subsequent pregnancies and vaginal deliveries. One patient had 5 normal deliveries later. Another patient was later delivered by elective cesarean section. The writers state that an elective cesarean section is probably the best way to manage subsequent pregnancies; there will be exceptions to this rule.

## THE PREVENTION AND TREATMENT OF POSTPARTUM HEMORRHAGE

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Mississippi Doctor, 25, 31-36, 1947

In this day a death from postpartum hemorrhage is a serious indictment of the doctor's ability and the hospital's administration. The reason for this statement, the treatment of postpartum hemorrhage and its prevention, are set forth in a review by a Chicago group. Mortality figures show that hemorrhage of all types caused 30 per cent of the United States maternal deaths in 1944 and 1945. At the Chicago Lying-in, 4 per cent of the maternal deaths over a 14 year period were due primarily to postpartum hemorrhage. In another 4 per cent, hemorrhage was a contributing factor. At Philadelphia 5 per cent and in New York Lying-in 9 per cent were due to postpartum hemorrhage. By case analysis these deaths have been shown to be due to preventable factors.

The causes of postpartum hemorrhage are: 1. Uterine atony. (a) Incomplete separation of the placenta or retention of a piece; (b) Overdistention (Multiple pregnancy, polyhydramnios, etc.); (c) Anesthesia, and to a less degree, analgesia; (d) Prolonged labor; (e) Tendency for postpartum hemorrhage. 2. Trauma, Dührssen's incisions or lacerations of the vagina, cervix or uterus. 3. Abnormal placental sites or attachments. (a) Placenta previa; (b) abruptio placentae; (c) Placenta accreta. 4. Neoplasms of the uterus.

It is believed that the proper conduct of the second and third stages of labor will prevent almost all postpartum hemorrhages. The routine technique for handling the second and third stages at the Chicago Lying-in is: 1. Deliver the anterior shoulder. 2. Wait 30 seconds and deliver the posterior shoulder. 3. Inject one unit of posterior pituitary solution; then slowly deliver the baby, the total delivery time being 3 minutes. The cord is held close to the vulva, stripped once towards the baby and clamped. The placenta is expressed by the Pastore

hour or so after the accident has occurred and in which shock has already developed. When inversion takes place before your eyes or has developed only a few minutes previously, the proper procedure is of course to replace the uterus; at that juncture the cervix has not yet contracted down, the patient is usually in good condition and the outcome is generally satisfactory. Upon this almost everyone concurs. There is also rather general agreement upon the management of inversion in cases which are not seen until some hours or days after the accident and in which the patient has either escaped (rare), or has completely recovered from, the shock phase. In these late cases it is the consensus that local interference should be deferred until the temperature and leucocyte count are normal and the uterus has involuted to normal size, that is, for several weeks; then, after suitable pre-operative preparation, surgical correction of the inversion is effected. As in the very early cases the results in these late cases have been good. But in between these two extremes of time, there exists an interval—from 15 minutes to 5 or 6 hours after the accident, let us say—which is the really crucial period, because the great majority of women who die of this complication die at that time.

It has long been orthodox teaching that, during this critical period when inversion is complicated by shock, no attempt should be made to replace the uterus until the shock has been corrected by blood transfusion, Trendelenburg position, heat, etc. As long ago as 1912 Hoover wrote that "mere displacement should be ignored until shock, which is so frequently present, has been satisfactorily treated." In his series, 30 per cent of the patients died when reposition was attempted in the presence of shock, as against 5 per cent in its absence (*J. A. M. A.*, 58, 633, 1912). In 1925 McCullagh cited almost identical figures (*Jour. Obstet. & Gynec., Brit. Emp.*, 32, 280, 1925); and more recently McLennan and McKelvey have re-emphasized this point, advising that the inverted uterus be virtually disregarded during the acute phase except for adequate control of bleeding and infection (*J. A. M. A.*, 120, 679, 1942). Our text-books likewise recommend a "hands-off" policy until shock has been combatted.

By referring to the next to the last paragraph of the above abstract, it may be noted that Henderson ignored orthodox teachings and replaced the uterus when the patient was in plain collapse and, moreover, was getting worse. Yet immediate and dramatic improvement ensued following reposition. I know of several other similar cases. Furthermore, in the 7 cases reported by the Boston Lying-In group in which abdominal reposition was effected, all but 1 of the patients was in outright shock at the time of the operation, but immediate improvement occurred just as soon as the inversion was corrected, and all survived (Huntington, Irving and Kellogg: *Am. Jour. Obst. & Gynec.*: 15, 34, 1928; *ibid*, 22, 440, 1931).

There can be no doubt that many women have died in association with reposition of an inverted uterus in the presence of shock. On the other hand, I am sure that a goodly number of patients have also died while shock therapy was being administered in preparation for reposition. In these cases the persistence of the condition causing the shock nullifies efforts to combat it. During the past year I watched a woman die from the shock of acute inversion while whole blood was being poured into both arms and plasma into a leg vein. The patient (*J. H. H. No. 406710*) was a 28 year old white woman who had been delivered by her family physician at home of her second infant at 1:25 P.M. on December 3, 1946. Owing to profuse third stage bleeding vigorous massage of the uterus was carried out and at 2 P.M., complete inversion of the uterus occurred. The patient arrived on our delivery floor at 2:28 P.M., with cold, clammy extremities, cardiac rate of 180 detectable only at the heart apex and blood pressure of 64/30. Glucose with saline was started at 2:35 P.M., plasma at 2:45 and whole blood at 2:55. Within the next hour the patient received 1100 cc of whole blood, 500 cc of plasma and 700 cc of glucose with saline, but she had grown progressively worse and at 4:00 P.M., the blood pressure was unobtainable. Despite additional blood and the usual supportive measures, she died at 4:21 P.M.,—3 hours following delivery, 2 hours and 21 minutes after inversion and 1 hour and 53 minutes after arrival on the delivery floor. Because of the profound shock, no attempt at reposition was made.

predisposition to inversion, possibly the result of variation in the uterine musculature or its innervation.

Diagnosis of inversion in this series was complicated because only 5 of the cases were accompanied by evident prolapse of the uterus. In the remaining 17 the diagnosis was made on the basis of shock and hemorrhage, and abdominal and vaginal examination. Abdominal examination is quite unreliable because the inverted fundus is in the normal position in the pelvis and the characteristic dimpling of the uterine tumor may be missed because of a thick abdominal wall. For this reason it should be mandatory for all cases of hemorrhage, with or without shock, to have a vaginal examination made at once. The boggy mass of the inverted uterus is readily found if it is looked for.

The present-day trend in treatment of this condition is summarized by Barrett as follows: First, the immediate period, when shock and hemorrhage are not too severe, and before sepsis and development of a contraction ring make replacement difficult. Here immediate replacement is advised. Second, the intermediate period, when the above conditions have supervened. Here conservative treatment is indicated. In the late period, when these adverse conditions are under control, replacement is done by an appropriate method (Ill. Med. J., 85: 253-260, 1944).

The fatalities in the author's series all occurred within 6 hours, the immediate period referred to by Barrett as the time for active intervention. During this period hemorrhage is continuing and shock is increasing. Blood transfusion and other supportive measures may not be enough to halt the process, which is enhanced by the stretching and pinching of the nerve plexus in the broad ligaments and ovaries. Replacement at this time is relatively simple and should be carried out at once.

To illustrate this point, a 22 year old para 0 gravida 1 was delivered normally at 4:10 P.M. with a reported blood loss of 200-300 cc. She was very restless and at 5:30 was given  $\frac{1}{32}$  gr. of dilaudid. She bled profusely and was given ergot and 1000 cc. of glucose in saline. Her blood pressure dropped to 60/40 and at 6:50 she was given 500 cc. of blood. Blood and plasma were continued and oxygen administered. The patient's pulse became imperceptible and respiration stopped. She was being given artificial respiration by means of the gas machine when seen by the author at 8:30 P.M. At this time blood and plasma were being given into both arms. Examination disclosed an inverted uterus which was immediately replaced. Almost instantly her pulse improved and spontaneous respiration started. Complete recovery followed.

Replacement of the acute puerperal uterus is a relatively simple procedure. Ring forceps clamped on the edge of the cervical rim, accompanied by traction with counter pressure on the inverted fundus, will readily correct the inversion. Packing may be used to keep the uterus in place, but this is usually not necessary. In none of the reported cases was there any difficulty with this maneuver whether it was carried out by the consultant, the attending physician or the resident.

(The most difficult problem in the treatment of acute puerperal inversion of the uterus—and one of the gravest in all obstetrics—is the management of a case which is first seen an

hour or so after the accident has occurred and in which shock has already developed. When inversion takes place before your eyes or has developed only a few minutes previously, the proper procedure is of course to replace the uterus; at that juncture the cervix has not yet contracted down, the patient is usually in good condition and the outcome is generally satisfactory. Upon this almost everyone concurs. There is also rather general agreement upon the management of inversion in cases which are not seen until some hours or days after the accident and in which the patient has either escaped (rare), or has completely recovered from, the shock phase. In these late cases it is the consensus that local interference should be deferred until the temperature and leucocyte count are normal and the uterus has involuted to normal size, that is, for several weeks; then, after suitable pre-operative preparation, surgical correction of the inversion is effected. As in the very early cases the results in these late cases have been good. But in between these two extremes of time, there exists an interval—from 15 minutes to 5 or 6 hours after the accident, let us say—which is the really crucial period, because the great majority of women who die of this complication die at that time.

It has long been orthodox teaching that, during this critical period when inversion is complicated by shock, no attempt should be made to replace the uterus until the shock has been corrected by blood transfusion, Trendelenburg position, heat, etc. As long ago as 1912 Hoover wrote that "mere displacement should be ignored until shock, which is so frequently present, has been satisfactorily treated." In his series, 30 per cent of the patients died when reposition was attempted in the presence of shock, as against 5 per cent in its absence (J. A. M. A., 58, 633, 1912). In 1925 McCullagh cited almost identical figures (Jour. Obstet. & Gynec., Brit. Emp., 32, 280, 1925); and more recently McLennan and McKelvey have re-emphasized this point, advising that the inverted uterus be virtually disregarded during the acute phase except for adequate control of bleeding and infection (J. A. M. A., 120, 679, 1942). Our text-books likewise recommend a "hands-off" policy until shock has been combatted.

By referring to the next to the last paragraph of the above abstract, it may be noted that Henderson ignored orthodox teachings and replaced the uterus when the patient was in plain collapse and, moreover, was getting worse. Yet immediate and dramatic improvement ensued following reposition. I know of several other similar cases. Furthermore, in the 7 cases reported by the Boston Lying-In group in which abdominal reposition was effected, all but 1 of the patients was in outright shock at the time of the operation, but immediate improvement occurred just as soon as the inversion was corrected, and all survived (Huntington, Irving and Kellogg: Am. Jour. Obst. & Gynec.: 15, 34, 1928; *ibid*, 22, 440, 1931).

There can be no doubt that many women have died in association with reposition of an inverted uterus in the presence of shock. On the other hand, I am sure that a goodly number of patients have also died while shock therapy was being administered in preparation for reposition. In these cases the persistence of the condition causing the shock nullifies efforts to combat it. During the past year I watched a woman die from the shock of acute inversion while whole blood was being poured into both arms and plasma into a leg vein. The patient (J. H. H. No. 406710) was a 28 year old white woman who had been delivered by her family physician at home of her second infant at 1:25 P.M. on December 3, 1946. Owing to profuse third stage bleeding vigorous massage of the uterus was carried out and at 2 P.M., complete inversion of the uterus occurred. The patient arrived on our delivery floor at 2:28 P.M., with cold, clammy extremities, cardiac rate of 180 detectable only at the heart apex and blood pressure of 64/30. Glucose with saline was started at 2:35 P.M., plasma at 2:45 and whole blood at 2:55. Within the next hour the patient received 1100 cc of whole blood, 500 cc of plasma and 700 cc of glucose with saline, but she had grown progressively worse and at 4:00 P.M., the blood pressure was unobtainable. Despite additional blood and the usual supportive measures, she died at 4:21 P.M.,—3 hours following delivery, 2 hours and 21 minutes after inversion and 1 hour and 53 minutes after arrival on the delivery floor. Because of the profound shock, no attempt at reposition was made.

What the outcome in this case would have been if we had attempted vaginal replacement about 3:30, or better, abdominal reposition, cannot of course be said; but the experience left me with the feeling that the "hands off" policy may be carried too far in some of these cases and that it might be wiser, after 30 minutes of intensive anti-shock therapy, to proceed with the correction of the cause of the shock even though shock still persists. In view of the excellent results reported by the Boston group with the abdominal approach, this operation should be employed if vaginal reposition cannot be effected easily and promptly.

Henderson speaks of vaginal reposition as "a relatively simple procedure." This is not always true, several authors reporting a 10 to 15 per cent incidence of failure even when the procedure was attempted during the optimum period. In our own case an attempt was made to replace the uterus about 20 minutes post mortem, but it could not be done through the 4 or 5 cm. cervix.—Ed.)

## THROMBO-EMBOLIC DISEASE AND PREGNANCY

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Illinois M. J., 91, 305-311, 1947

Before outlining the treatment of thrombo-embolic diseases a discussion of the anatomy, physiology, and pathology of the circulation of the lower extremity is given. The clinical differentiation between thrombo-phlebitis, phlebothrombosis and pulmonary embolism likewise is emphasized. Instead of pyrexia, local signs of inflammation, swelling and edema as seen in thrombophlebitis, the diagnosis of phlebothrombosis is usually made on a very few clinical manifestations. There usually is an increased pulse rate out of proportion to the temperature, regional pain and tenderness, a palpable clot, positive Homans' sign and an increased sedimentation rate.

The treatment of thrombo-embolic diseases first involves prophylaxis. Varicose veins are a predisposing factor and should be treated. Venous stasis in the extremities after delivery or surgery should be avoided by maintaining arterial pressure and tone, facilitating drainage during surgery by use of the Trendelenburg position, avoiding tight abdominal binders, ordering early movement of extremities, and encouraging deep breathing. Hemoconcentration should be avoided by adequate fluids; sepsis adhered to; medical disorders corrected before surgery or delivery; chilling of the body avoided; no smoking allowed; patient not kept in stirrups or the lithotomy position too long; anticoagulants should be used prophylactically if indicated.

Active therapy depends on the type of embolic disease present. If thrombo-phlebitis is diagnosed a conservative plan would consist of bed rest, elevation of the limb, heat (110°F), restriction of fluid and salt if edema is present, salyrgan to reduce edema, anticoagulants, then physiotherapy after the temperature is normal. The other two choices are lumbar sympathetic block and vein ligation.

In phlebothrombosis emergency treatment is imperative, namely, simple proximal ligation and thrombectomy. Anticoagulants are also indicated. In pulmonary embolism the immediate administration of 100 per cent oxygen, papaverine grs.  $\frac{1}{2}$  i.v., and atropine grs.  $\frac{1}{15}$  i.v. is an acceptable method of therapy.

A total of 12 cases of thrombo-embolic disease and pregnancy were presented; 8 postpartum complications and 4 antepartum. Two antepartum cases had vein ligations for phlebothrombosis.

## CONSTRICTION RING DYSTOCIA

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Am. J. Obst. & Gynec., 53: 796-804, 1947

The authors have collected a series of 56 parturients with a constriction ring dystocia. The data of this series is presented as follows:

1. Mortality:
  - a. Gross maternal mortality of 2, or 3.5 per cent
  - b. Gross fetal mortality of 18, or 32 per cent
2. Parity:
  - a. Primiparas—27, or 48 per cent
  - b. Multiparas—29, or 52 per cent
3. Diagnosis was made:
  - a. First stage in 36, or 64 per cent
  - b. Second stage in 20, or 36 per cent
4. Gross operative incidence in 52, or 93 per cent
  - a. Fetal mortality of 16, or 30 per cent
5. Failed vaginal operations in 22, or 40 per cent
  - a. Fetal mortality of 9, or 41 per cent
6. Dührssen's incisions and forceps operation in 4, or 0.7 per cent
  - a. Fetal mortality of 1, or 25 per cent
  - b. Complications:
    1. Failed forceps in one which was followed by a craniotomy
    2. Shock in 3, one with severe sepsis
7. Diagnosis of the rings:
  - a. External in 21, or 38 per cent
  - b. Internal in 35, or 62 per cent
8. Location of the rings:
  - a. Region of the "obstetric" internal os in 40, or 71 per cent
  - b. Junction of the upper and lower uterine segment in 9, or 16 per cent
  - c. In the upper uterine segment in 7, or 13 per cent

## 9. Delivery:

- a. Vaginal in 42, or 75 per cent
- b. Cesarean sections in 14, or 25 per cent (one a Porro cesarean section)
  1. First stage in 12, or 88 per cent
    - a. Maternal mortality 1, or 8 per cent
    - b. Fetal mortality, 0
  2. Second stage in 2, or 14 per cent (one a Porro cesarean section)
    - a. Maternal mortality, 0
    - b. Fetal mortality, 0

The speculative diagnosis of constriction ring is a prolonged first stage, irregular uterine contractions, prolonged and intermittent periods of cervical dilatation, and the arrest of the presenting part in the second stage of labor. The absolute diagnosis is the intrauterine palpation of a constriction ring, the state of the cervix and the lower pole of the uterus, and a transverse extrauterine constriction ring. The signs and symptoms are as follows:

1. Uterine contractions vary in frequency, intensity and duration. Phillips has called attention to these colicky uterine contractions in which the pain persists to and beyond the cessation of the contraction.
2. Station of the fetal head is stationary during the second stage.
3. Fetal head is loose in the pelvic cavity during uterine contraction, which is pathognomonic.
4. Laxity of the cervix during the height of a uterine contraction; the cervix and the lower pole of the uterus are flaccid at the height of contraction. The external os is not taut as during a normal contraction, and is dilatable. This laxity is pathognomonic.

The writers describe the types of constriction ring dystocia as follows:

*Type 1.*—Internal constriction ring and a potential prolonged first stage of labor. After 18 hours of labor, the character of uterine contractions and cervical dilatation will indicate a prolonged first stage. Absolute diagnosis of constriction ring dystocia is made by sterile vaginal examination. The cardinal signs of the cervix and lower pole of the uterus are diagnostic.

*Type 2.*—External constriction ring and a potential prolonged first and second stage of labor. The early appearance of a transverse extrauterine depression or ring of the uterus at various levels, seen or palpated on the abdominal wall, will correspond with an internal ring at the same site. This external depression is diagnostic of an internal constriction ring, which in the authors' opinion is pathognomonic.

*Type 3.*—Internal constriction ring complicating the second stage of labor. When forceps and version operations fail, an intrauterine examination is made to determine the cause of difficulty. If the ring is in the region of the fetal neck, it can usually be reached without much displacement of the fetal head and with slight danger of prolapse of the cord, but when the ring is much higher the head must be displaced out of the pelvic cavity with great danger of prolapse of the cord. When the ring is in the region of the fetal neck, it is from 6 to 10 cm. from the external os.



In 1935, the senior author advocated a conservative management of the constriction ring dystocia of the first and second stage of labor. The basic principle of conservative management is the maintenance of the parturient's mental and physical condition, and the prevention of maternal exhaustion during prolonged first and second stages of labor. The ultraconservative management is to await the second stage until the ring has relaxed. This is determined by a further descent of the presenting part from its previous station. This will prevent hasty operative interference and failed operations in the second stage.

In *Type 1* constriction ring, when sterile vaginal examination after 18 hours of labor reveals the presence of a ring, the management resolves itself to either the ultraconservative, or a possible cesarean section, depending upon the signs found at vaginal examination. If cesarean section is elected, a further functional test of labor of not more than 10 hours is permitted to carry out the indication that labor will be unduly prolonged. In the present series the authors had 16, or 29 per cent, who were treated by a partial conservative management with one maternal death (9 per cent) and 5 fetal deaths (31 per cent). Vaginal operative interference occurred in the first stage of 9 (56 per cent), with a fetal mortality of 4 (44 per cent), while second stage parturients were treated by ultraconservative management in 7 cases (44 per cent), with a fetal mortality of 1 (14 per cent).

In *Type 2* constriction ring, with or without sterile vaginal examination after 18 hours of labor, the patient is treated conservatively, and after about 10 hours more it is decided whether the management will be the ultraconservative or cesarean section. In this series there were 21 (38 per cent) external constriction rings present early in labor. The maternal mortality was one (5 per cent), and the fetal mortality was 3 (14 per cent). Cesarean sections were performed in 12 cases after a labor of 36 to 88 hours with no maternal or fetal mortality. Vaginal delivery was done in 9 cases with a fetal mortality of 4 (44 per cent).

In *Type 3* constriction ring, if there is a speculation of constriction ring dystocia in the second stage, forceps or version operation is a trial procedure. When difficulty arises in the operative procedure, an intrauterine diagnosis of constriction ring is made, and the ultraconservative management is instituted until the ring relaxes. In this series there were 19 (34 per cent) who reached the second stage with no maternal mortality, and a fetal mortality of 8 (42 per cent). Failed operations occurred in 16 (84 per cent), with a fetal mortality of 5 (31 per cent). The ultraconservative management was followed in 12 (63 per cent) with a fetal mortality of 4 (33 per cent).

The operations of Dührssen's incisions and forceps, manual dilatation of the cervix, and version and extraction are mentioned only to be condemned for constriction ring dystocia. The authors advocate the ultraconservative management, and cesarean section when properly evaluated.

## BREECH PRESENTATIONS

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Practitioner, 159: 11-14, 1947

The author's conclusion in this paper is that breech labor, in the absence of disproportion, can almost always be brought to a completely satisfactory conclusion for both mother and child if it is conducted in a reasonable environment by experienced personnel. Radical interference should be deferred until an experienced second opinion has been obtained.

Breech presentation should be suspected (usually not possible before the 24th week of pregnancy) when a hard, rounded, mobile mass occupies the upper part of the uterus and a less hard, irregular mass occupies the lower segment. X-ray examination will confirm or disprove this diagnosis. The fetal heart can be heard with maximum intensity above the level of the umbilicus only when pregnancy is near term and the full breech is above the pelvic brim. A breech presentation should be considered as secondary to some other abnormality until such abnormality is excluded by clinical examination. In the majority of cases the breech will prove to be primary; a breech secondary to some other abnormality calls for institutional treatment by a specialist.

If there is any difficulty in carrying out external cephalic version before the 32nd week of pregnancy, a primary breech presentation should be left alone. Between the 32nd and 34th week a more determined effort at external cephalic version should be made. If this fails, a second opinion should be obtained, or version under anesthesia should be considered. Complications following attempts at external version, such as onset of premature labor, hemorrhage, creation of a transverse lie, prolapse of the cord and fetal death *in utero*, are very rare in experienced hands, but are more likely to occur in the anesthetized patient when greater application of force without her resentment becomes possible.

If version is impracticable, arrangements can often be made to ensure delivery in the best available circumstances. Whenever possible, breech labor should be preceded by careful clinical pelvimetry, both external and internal, and by X-ray pelvimetry. The two most important clinical measurements are the diagonal conjugate and the transverse distance between the tuber ischii.

The conduct of the first stage of a breech labor differs very little from that of a vertex labor. The conduct of the second stage should be governed by the general principle of interfering as little as possible and as late as possible. Nearly all catastrophes in breech labors can be attributed either to the presence of disproportion or to premature attempts at delivery when the cervix, vagina and pelvic floor are incompletely dilated. One vaginal examination should be made after the membranes rupture, to ensure that the cord is not prolapsing, to assess the state of the cervix, and find the degree of breech presenting. When the breech begins to peep, the patient should be placed in lithotomy position and a postero-

lateral perineotomy should be carried out on the side on which the legs are situated. This should be done in primigravidae always and in multigravidae when the perineum is tight. In full breech, the 2 buttocks and feet should be allowed to pass through the vulva without aid. In extended breech, the buttocks, the lower lumbar spine and the extended femora should protrude so that the popliteal spaces are flush with the vulva before the legs are disengaged from the vagina. Following this, no traction should be made from below but the skilled use of fundal pressure to augment labor pains is often helpful. As soon as the inferior angle of a scapula is visible in the subpubic angle, the posterior arm should be brought down, and then the anterior arm. The technique for effecting delivery of the head as advocated by Burns and Marshall of Liverpool consists of allowing the fetus to hang by its own weight until the head is no longer palpable in the lower abdomen, and the occipital protuberance is visible or palpable in the sub-pubic angle. The fetus is then grasped by the ankles and is stretched to render its body just taut and the legs are gently carried upwards in a large arc towards the mother's abdomen, the birth of the head through the vulva being controlled by the other hand. In general, the author believes that the Burns-Marshall method should be practiced in the first instance but if there is a delay of more than 2 minutes, if the fetus is making respiratory efforts or if the cord is pulsating unsatisfactorily, then the method of Mauriceau-Smellie-Veit should be used.

Cesarean section has a definite though limited place in avoiding risks entailed in breech labor. The primary consideration should be of the relative risks of breech labor and cesarean section to the mother. Disproportion is the primary indication for cesarean section and it is warranted by much lesser degrees of disproportion than would be accepted as indication in vertex cases. The final decision will depend upon clinical and radiological assessment of fetal and pelvic size and on the amount of influence such factors as age of the patient, importance of the child, rigidity of soft tissues, etc., are allowed to exert.

## THE PUERPERIUM

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*Practitioner, 159: 29-32, 1947*

The writer discusses some points of interest in the practical management of the puerperium. The first 48 hours are relatively uneventful unless the labor has been a very stormy one. The possibility of post-partum eclampsia must not be overlooked if the patient has had preeclamptic toxemia of any severity; adequate sedation is indicated in such cases. During this immediate post-partum

period, ergot is best administered as a tablet of ergometrine, 0.5 mgm., three times daily. This should be employed only if there is poor tone in the uterine muscle with clot retention, in the presence of retained products, and following cesarean section. Prophylactic chemotherapy should be employed only if the labor has been of such a character that sepsis is almost inevitable. If prophylaxis is indicated, sulfadiazine, 2 gm., followed by 1 gm. 4-hourly may be given. If anaerobic streptococci are the responsible infecting organism, penicillin, as well as the sulfonamide drugs, is often indicated. Another complication of the first 2 days is urinary retention. The passage of a catheter for residual urine may be necessary on the second morning. Carbachol, 1 cc., is valuable for acute retention.

The third and fourth days are the most critical of the puerperium. Prelactational engorgement may necessitate support to the breast, avoidance of overstimulation by the baby and sedation. Overtreatment should be avoided.

It is at this time that infection of the genital tract manifests itself. Colebrooke demonstrated that in 60 to 70 per cent of cases of severe genital tract infection the responsible organism was a group A hemolytic streptococcus of exogenous origin. However, frequently there is infection with anaerobic streptococci in cases associated with local trauma or retained products. Therefore, in all cases of suspected infection a vaginal swab, a catheter specimen of urine and a throat swab should be taken and the patient started on sulfonamide drugs and penicillin. There may be need for the removal of perineal stitches at this time if there is local evidence of infection of the laceration, so that free drainage can be established.

The value of heparin and dicoumarin in the prophylaxis of venous thrombosis is at present *sub judice*. The author believes it reasonable to start the administration of dicoumarin 12 to 14 hours after delivery in patients with extensive varicosities. Three hundred mgm. should be given on the first day, followed by 200 mgm. per day. It should be used only if it is possible to have daily estimations of the prothrombin time; if the latter reaches 35 seconds, dicoumarin should be stopped. The only adequate antidote for overdosage is blood transfusion. If venous thrombosis occurs before dicoumarin has been given, heparin may be given for 2 days in conjunction with dicoumarin, until the latter produces its effect.

The writer is completely unconvinced by arguments in favor of the patient being out of bed during the fifth to the tenth day, but a routine of breathing, limb, abdominal and pelvic floor muscle exercises should be established during this time. Often there is delay in involution of the uterus together with a "niggling temperature," indicating a low-grade infective process. Intrauterine glycerin with 5 per cent sulfathiazole may be of value in cases of delayed involution if the lochial discharge appears to be held up or if there is evidence of some retained membrane. It cannot be too strongly emphasized that a low-grade infection is nearly always the cause of these slight pyrexias and that they should be regarded seriously. Femoral thrombosis is nearly always preceded by local pelvic infection or by anemia.

If the correction of retroversion of the uterus is not attempted until the final examination at 6 to 8 weeks, harm to involution of both uterine muscle and its supporting structures is done. The author always sees the patient at the end of the third week, having instructed her to lie on her face when sleeping and to continue with pelvic floor exercises. If the uterus is not in the correct anteverted position, a pessary is put in for one month; it may then be removed. Untold harm can come of leaving the uterus in the retroverted position during that important month. During that month too, if practicable and necessary, faradism may be given to the abdominal muscles and to the levatores ani to improve their tone and prevent visceroptosis and pelvic floor prolapse.

## THE NEWBORN

### PROPHYLAXIS AGAINST OPHTHALMIA NEONATORUM

#### CLINICAL COMPARISON OF PENICILLIN AND SILVER NITRATE: A PRELIMINARY REPORT

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Pharmacologically, silver nitrate is designated as a caustic, an astringent and a disinfectant. The disinfectant action of the compound is due to the free silver ion; its bactericidal property is a result of its combination with the protein of the micro-organism. Unfortunately, it also combines with proteins of the tissues; this explains its painful and destructive action. The most serious criticism of the use of silver nitrate is the doubtfulness of its value in the prevention of infectious acute conjunctivitis of the newborn. In 1935 Lehrfeld analyzed the records in 28,000 births occurring in 6 hospitals over a period of 5 years. He found the incidence of ophthalmia neonatorum to be 2.2 per cent (J. A. M. A., 104: 1468 (April 27) 1935). According to Thompson conjunctivitis caused by the pneumococcus, if once well established, can be equally destructive (J. Missouri M. A., 14: 7, 1917). Ideal prophylaxis would be that which would destroy or inhibit the growth of these two organisms and as many other causative organisms as possible.

Since the discovery of penicillin, investigators have turned their attention toward its properties in relation to the eye and patients with gonorrheal ophthalmia have been successfully treated with penicillin. Griffey reported the treatment of a patient with gonorrheal conjunctivitis by the use of penicillin given intramuscularly (Arch. Ophth. 31: 162, February, 1944). McCullough reported a case of sulfathiazole-resistant gonococcal conjunctivitis in an adult which yielded to a combination of topical (1,000 units per cubic centimeter) and parenteral administrations of penicillin (Canad. M. A. J., 52: 284, 1945). Seelig treated a patient by subconjunctival injections and local instillations (500 units per cubic centimeter) (U. S. Nav. M. Bull., 44: 389, 1945). Lewis reported the use of penicillin, local (1,000 and 2,500 units per cubic centimeter) and systemic administrations combined, in the treatment of 30 patients with results better than those obtained with the use of sulfonamide compounds (Am. J. Ophth. 29: 694, 1945).

Sorsby and Hoffa in 1945 reported the treatment of ophthalmia neonatorum in 47 infants with only the local application of penicillin in the form of drops. Concentrations of 500, 1,000, 1,500 and 2,500 Oxford units per cubic centimeter were used, and the results became more satisfactory as the concentration of penicillin

in the drops increased. Twenty-two infants were treated with a concentration of 2,500 Oxford units; there were 21 cures. The causative organism of the therapeutic failure was diphtheroid. Included in this group of 22 infants were 5 with gonorrheal ophthalmia. Thirteen of the 22 were cured clinically within 48 hours, and the remaining 8 within 100 hours. These authors stated that the drug is well tolerated by the infants' eyes; occasionally a mild transitory flushing of the conjunctivas may be observed (Brit. M. J. 1: 114, 1945).

The present study by Franklin was undertaken to evaluate clinically the use of penicillin in the form of drops for prophylaxis against ophthalmia neonatorum and to compare it with silver nitrate as commonly used for this purpose. For a 4 month period (beginning July 1, 1946) penicillin was used for prophylaxis in the eyes of each newborn infant delivered at the John Gaston Hospital, Memphis, Tennessee. For comparison silver nitrate was used for a 3 month period.

Penicillin was used in the form of the crystalline sodium salt of penicillin. A concentration of 2,500 units per cubic centimeter of diluent was used throughout. Sterile isotonic solution of sodium chloride was used as a diluent throughout, except for one and one-half months when sterile distilled water was used. A fresh solution was made as needed but was not kept longer than a week. It was kept refrigerated below 59 F. (15 C.) when not in use. Silver nitrate was used as a 1 per cent solution in distilled water. A fresh solution was made each day and dispensed from the drug room in a new dropper bottle.

Prophylaxis of the eyes of each newborn infant was carried out in the delivery room within one hour of birth, before the infant went to the nursery. The eyelids and adjacent area of the newborn infant were cleansed of contaminating secretions by gently wiping with a large ball of cotton from the inner canthus outward. The eye was closed at the time. Gauze was then used on the fingers for traction to open the eyelids while each eye was flushed thoroughly with 2 or 3 cc. of sterile isotonic solution of sodium chloride (or sterile distilled water when it was the diluent for the penicillin). One drop of penicillin solution was then instilled into the conjunctival sac of each eye. Instillations were also carried out in the nursery. A single drop of penicillin was instilled daily in each eye of each infant for the first three days of life.

When silver nitrate was used ocular prophylaxis was carried out in the delivery room in the manner previously described, except that one drop of silver nitrate was instilled instead of penicillin and sterile distilled water was used for flushing the eyes. The infants did not receive any prophylaxis in the nursery.

A total of 1,710 infants were studied clinically in the nursery and in the home during the first two weeks of life. In the nursery the occurrence of pus was approximately one-third as frequent in the penicillin group as in the silver nitrate group. The occurrence of pus in relation to the day of life was sporadic in approximately half the infants in the penicillin group but showed grouping around the day of birth and first day of life in the silver nitrate group. Other abnormalities—conjunctival redness, swelling of the eyelids and watery discharge—were much less frequent in the penicillin group. In no infant in the penicillin group

did gonococcic conjunctivitis develop, but 1 infant in the silver nitrate group did show gonococcic conjunctivitis on the fourth day of life

While at home a higher percentage of those in the penicillin group exhibited pus and other abnormalities of the eye than of those in the silver nitrate group. Four from the penicillin group and 2 from the silver nitrate group were hospitalized. There were no cases of gonococcic conjunctivitis in either group during the first two weeks at home.

In the study of this series of infants penicillin compares favorably with silver nitrate as a prophylactic agent. Penicillin prophylaxis is to be preferred because danger of permanent injury to the eye is eliminated; an instillation is nonpainful; ocular abnormalities are less frequent during the first days of life; the solution of penicillin need not be made fresh each day; deterioration does not produce noxious substances; an excess of the solution may be used if desired, and the penicillin solution may be used for both prophylaxis and treatment.

(It seems not unlikely that penicillin, either locally or intramuscularly, will displace silver nitrate almost entirely in the prophylaxis of gonorrheal ophthalmia within the next few years. This prediction is based on several considerations:

(1) The efficacy of penicillin in the treatment of gonococcal urethritis far surpasses that of any other agent; indeed, a single intramuscular injection of 200,000 units will cure within a few hours the great majority of acute cases.

(2) The efficacy of penicillin in the treatment of fulminating gonococcal conjunctivitis, whether it be given locally or intramuscularly, is attested by a number of case reports, some of which are cited in the above abstract. In the case of Griffey's mentioned, the patient was a 24 year old male who suffered from acute gonococcal urethritis as well as conjunctivitis. The latter had proved resistant to sulfathiazole and a copious purulent discharge persisted from the right eye despite 10 days administration of that drug. Spreads of the exudate from the conjunctival sac disclosed gram-negative intracellular diplococci, which were identified as gonococci by culture studies. The sulfathiazole was discontinued and penicillin started, 25,000 units being given every 3 hours for a total of 10 injections. As a means of observation of the bactericidal effect of the therapy, hourly examinations of spreads and cultures of the conjunctival secretions were made. Both were recorded as positive for *Neisseria gonorrhoeae* for 5 hours, after which the results of examination were persistently negative. The clinical response was prompt. Approximately 10 hours after the beginning of penicillin therapy the exudate of the eye had greatly diminished and after the inflammation subsided the eye returned to normal.

(3) The findings of Franklin, as digested in the above abstract, are being confirmed by other studies. Thus, in our clinic, on January 1, 1947, we gave up the use of silver nitrate instillations and substituted the following regime: to the mother, 200,000 units of penicillin intramuscularly when admitted in labor, repeated if labor lasts more than 18 hours; to the baby, 50,000 units intramuscularly within 15 minutes after delivery. To date over 2000 cases have been so handled; no case of gonorrheal conjunctivitis has occurred and the complete absence of chemical conjunctivitis is gratifying. With the exception of an occasional instance of transient erythema (less than 1 per cent) there have been no untoward developments. We plan in 1948 to omit the maternal injection as it is probably unnecessary. Two other Baltimore hospitals are employing only the 50,000 unit administration to the baby with results which have thus far been satisfactory. It is realized, of course, that upwards of 10,000 cases will have to be evaluated before such a deeply entrenched technique as silver nitrate prophylaxis can be advisedly discarded.

A number of objections can be raised to penicillin prophylaxis of ophthalmia neonatorum whether given locally or intramuscularly. The chief objection to local instillations is the



fact that the penicillin may not be deposited into the conjunctival sac. Given a wriggling baby and a sleepy interne at 3 A.M., this is bound to happen now and then. To my mind, the occasional failure of silver nitrate to prevent ophthalmia is due to this lapse rather than to any failure per se of the agent. The repeated instillations on the second and third days, as recommended by Franklin, will go far to correct such technical errors but constitute additional work for someone. Several possible objections to the intramuscular will come to mind: 1. With a dosage of 50,000 units to the baby it is much more expensive than silver nitrate ampoules, the relative costs being 12 cents as against 3 cents approximately. It may be recalled, however, that per pound body weight the dosage of 50,000 is 5 times that needed for the cure of a case of acute urethritis in the male. It is probable therefore that experience will show that the dosage can be reduced to such a figure that the expense will be no more than silver nitrate ampoules. 2. For home deliveries it is much less convenient than silver nitrate. Manufacture of small ampoules of penicillin together with twin ampoules of sterile water might meet this objection to some degree. 3. If the baby has latent syphilis the intramuscular injection will delay development of signs and symptoms. This will require more prolonged follow-up of these infants, but other than this our syphilologists have raised no objection.

The question may also be raised as to the legal status of penicillin as a prophylactic agent against ophthalmia neonatorum. The regulations vary widely from state to state but in the majority the state board of health is the final arbiter and all that is necessary is to gain its sanction. In a few states, however, the use of some silver preparation is mandatory. The regulations for each state are listed below as stated in Bascom Johnson's "Digest of Laws and Regulations Relating to the Prevention and Control of Syphilis and Gonorrhea in the Forty-eight States and the District of Columbia," U. S. Public Health Service Publication No. A-274, 1940.

*Alabama.* Any physician, midwife, nurse, or other person in attendance on a confinement case shall, within two hours after the birth of the child, use one of the following prophylactic solutions for the prevention of infantile blindness or ophthalmia neonatorum, two drops of the solution to be dropped in each eye after the eyelids have been opened: (1) A one per cent fresh solution of nitrate of silver; (2) A twenty-five per cent solution of argyrol; (3) A five per cent solution of protargol; or (4) such other solution as may be prescribed by the State Board of Health.

*Arizona.* No law or regulation except regulations requiring ophthalmia neonatorum to be reported.

*Arkansas.* No statutory provisions.

*California.* It shall be the duty of the State Department of Public Health to provide for the gratuitous distribution of a scientific prophylactic for ophthalmia neonatorum, together with proper directions for the use and administration thereof, to all physicians, midwives and such other persons as may be lawfully engaged in the practice of obstetrics or assisting at childbirths.

*Colorado.* Lists among duties of State Board of Health "To officially name and approve a prophylactic . . ." Makes it duty of physician, midwife, or nurse to use approved prophylactic on eyes of newly born babies within one hour after birth.

*Connecticut.* Any person in any state-aided institution or any midwife, in attendance at the birth of any infant, shall instill into the eyes of such infant, immediately after birth, one or two drops of a prophylactic solution. The state department of health shall furnish in a convenient form for such use a prophylactic solution for gratuitous distribution to midwives and institutions.

*Delaware.* It is made the duty of physicians or other persons in attendance at childbirth to instill in the eyes of the newborn either a 1 per cent solution of silver nitrate or a 10 per cent solution of argyrol or a 1 per cent solution of protargol or their therapeutic equivalent and to make record of the prophylactic used and to endorse the details thereto on every birth certificate.

*District of Columbia.* No laws or regulations on this subject.

*Florida.* No specific requirements.

*Georgia.* It is made the duty of any person in attendance on any childbirth to apply to the child such prophylactic treatment as may be prescribed by the State Board of Health to prevent blindness from gonococcus infection.

*Idaho.* It shall be unlawful for any physician or midwife practicing midwifery to neglect, or otherwise fail to instill or have instilled immediately upon its birth, in the eyes of the newborn babe, some germicide of proved efficiency in preventing the development of ophthalmia neonatorum. Every physician or midwife shall, in making a report of a birth, state whether or not the above germicide was instilled into the eyes of said infant.

*Illinois.* The physician, midwife or nurse attending at birth are under duty to instill a prophylactic in each eye as soon as possible after birth and not later than one hour thereafter. Such prophylactic must be approved by the State Department of Public Health.

*Indiana.* Whenever a child is born, the physician, midwife or any other person who is present and engaged as professional attendant, shall report said birth on a blank supplied by the state board of health to the health officer having jurisdiction, within 36 hours after such birth occurs. Said birth certificate in addition to other data ordered by the state board of health shall have upon it this question: Were precautions taken against ophthalmia neonatorum? And it shall be a violation of this act for any physician or midwife in professional attendance at a birth to fail to report same as herein commanded or to omit answering the said question: Were precautions taken against ophthalmia neonatorum? All bills or charges for professional services rendered at a birth shall be unlawful if report is not made as herein commanded. It shall be the duty of all physicians or midwives in professional attendance upon a birth to always carefully examine the eyes of the infant, and if there is the least reason for suspecting infection of one or both eyes then said physician or midwife in professional attendance shall apply such prophylactic treatment as may be recognized as efficient in medical science.

*Iowa.* Every physician shall immediately, upon the birth of an infant, instill into the eyes of such newly born infant a prophylactic solution approved by the state department.

*Kansas.* Any physician or any person authorized by law to act as an obstetrician shall immediately upon the birth of an infant instill into the eyes of such newly born infant a prophylactic solution approved by the State Board of Health: Provided, however, That any person or parent shall not be required to employ such prophylactic if objection is made by written statement to the attending obstetrician within three days from the birth of said child: And provided further, That said written statement shall be attached to the birth certificate.

*Kentucky.* Makes it the duty of each County Board of Health acting in cooperation with the county medical society and the State Board of Health to arrange for an annual course of instruction \* \* \* for the physicians, midwives, and nurses \* \* \* to teach the latest and best methods for the early recognition, treatment and prevention of ophthalmia \* \* \* and importance of reporting same.

*Louisiana.* It shall be the duty of the Louisiana State Board of Health to provide for the gratuitous distribution of a scientific prophylactic for ophthalmia neonatorum, together with proper directions for the use and administration thereof, to all physicians, midwives and the like, as may be engaged in the practice of obstetrics or assisting at childbirth.

*Maine.* Every physician, midwife, or nurse in charge shall instil or cause to be instilled into the eyes of the infant immediately upon its birth, one or two drops of a prophylactic solution prescribed by the state department of health, unless either parent or the guardian of the infant shall offer conscientious objections thereto.

*Maryland.* It is made the duty of a midwife in attendance at birth to instil a solution of nitrate of silver into the eyes of the newly born child within two hours after birth.

*Massachusetts.* The Department of Public Health shall furnish, free of cost, to registered physicians, such prophylactic remedies as it may deem best for the prevention of ophthalmia neonatorum. The physician, or hospital medical officer personally attending the

birth of a child, shall treat his eyes, within two hours after birth, with a prophylactic furnished or approved by the Department.

*Michigan.* Makes it the duty of the state health commissioner to officially name and approve a prophylaxis to be used in treating the eyes of newly born infants and to publish instructions for using the same. It shall be the duty of any physician, nurse, or midwife who shall assist or be in charge at the birth of any infant, or have care of the same after birth, to treat the eyes of the infant with a prophylaxis approved by the state health commissioner; and such treatment shall be given within one hour after the birth of the infant if a physician, nurse or midwife is then present, or as soon thereafter as a physician, nurse or midwife is present. Silver nitrate, 1.5 per cent in solution, has been approved by the State Council of Health as a prophylactic to be dropped into the child's eyes immediately after birth.

*Minnesota.* It shall be the duty of any physician or midwife in attendance on, or in charge of, a confinement case to treat the eyes of every newborn babe with a 1 per cent solution of silver nitrate.

*Mississippi.* It shall be the duty of the State Board of Health to provide for the gratuitous distribution of a scientific prophylactic for inflammation of the eyes of the newborn, together with proper directions for the use and administration thereof, to all physicians and midwives as may be engaged in the practice of obstetrics or assisting at childbirth. It shall be the duty of the physicians, midwives, or other persons in attendance upon a case of childbirth in a maternity home, hospital, public or charitable institution, in every infant immediately after birth, to use some prophylactic against inflammation of the eyes of the newborn and to make record of the prophylactic used. It shall be the duty of a midwife in every case of childbirth under her care, immediately after birth, to use such prophylactic against inflammation of the eyes of the newborn as the state board of health requires.

*Missouri.* Every physician, midwife or nurse who shall be in attendance upon a newborn infant or its mother, shall drop into the eyes of such infant immediately after delivery, a prophylactic solution approved by the state board of health, and shall within forty-eight hours thereafter, report in writing to the board of health or county physician of the city, town or county where such birth occurs, his or her compliance with this section, stating the solution used by him or her.

*Montana.* Waxed ampoules of nitrate of silver are furnished free to physicians and midwives.

*Nebraska.* Makes it the duty of every physician in attendance upon any lying-in woman . . . either in hospital or the general practice, upon the delivery of any newly born child, to use in the eyes of said child one of the following preparations: Nitrate of silver, 1% to 4% solution. Protargol, 10% to 40% solution. Argyrol, 40% to 50% solution.

*Nevada.* It shall be unlawful for any physician or midwife practicing midwifery to neglect, or otherwise fail to instil or have instilled immediately upon its birth, in the eyes of the newborn babe, some germicide of proven efficiency in preventing the development of ophthalmia neonatorum.

*New Hampshire.* The attending physician, accoucher, midwife or other person in charge, who shall attend, assist or advise at the birth of any living child in this state, shall, after washing the lids and adjacent tissues immediately following birth, drop into each eye of every child a single drop of a one per cent solution of nitrate of silver, or some equally efficient solution.

*New Jersey.* The State Board of Health shall furnish, free of cost, to physicians and midwives, registered under the laws of this State, such prophylactic remedies as it may deem best for the prevention of ophthalmia neonatorum, together with such instructions as it may deem necessary for the proper administration of the same.

*New Mexico.* It shall be the duty of any physician, nurse, midwife, or other person, in attendance upon a case of childbirth, to introduce into each eye of the newborn infant, within one hour of its birth, a one per centum (1%) solution of silver nitrate, or an antiseptic

tic of equal potency and harmlessness, except as hereinafter provided. It shall be the further duty of the attendant mentioned in Section 1 above to certify on the certificate of birth that the prophylactic treatment mentioned in Section 1 was actually applied as directed and to state what preparation was used for this purpose, except as hereinafter provided. Antiseptics of potency and harmlessness equivalent to a one per centum (1%) solution of silver nitrate, as provided in Section 1 hereof, shall be understood to be the following and no others: Twenty-five per centum (25%) solution of Argyrol, or five per centum (5%) solution of Protargol, or solutions of other silver compounds of equivalent strength and harmlessness to the eyes of the newborn.

*New York.* It shall be the duty of the attending physician, midwife, nurse, or other person in attendance on a confinement, to drop into both eyes of the infant immediately on delivery a one per cent solution of nitrate of silver, or some other agent equally efficient for preventing ophthalmia neonatorum.

*North Carolina.* It shall be unlawful for any physician or midwife practicing midwifery in the state of North Carolina to neglect or otherwise fail to instil or have instilled, immediately upon its birth, in the eyes of the newborn babe, two drops of a solution prescribed or furnished by the state board of health.

*North Dakota.* Duty of physician, midwife or other attendant. That whenever a child is born, the physician, midwife or any other person who is present and engaged as professional attendant, shall report said birth on a blank supplied by the state board of health to the health officer having jurisdiction, within thirty-six hours after such birth occurs. Said birth certificate in addition to other data ordered by the state board of health shall have upon it this question: "Were precautions taken against ophthalmia neonatorum?" And it shall be a violation of this act for any physician or midwife in professional attendance at a birth to fail to report same as herein commanded or to omit answering the said question, "Were precautions taken against ophthalmia neonatorum?" All bills or charges for professional services rendered at a birth shall be unlawful if report is not made as herein commanded. It shall be the duty of all physicians or midwives in professional attendance upon a birth to always carefully examine the eyes of the infant, and if there is the least reason for suspecting disease of the eyes then said physician or midwife in professional attendance shall apply such prophylactic treatment as may be recognized as efficient in medical science.

*Ohio.* It is the duty of physicians or others in attendance at childbirth in a maternity home, hospital, public or charitable institution to instil a prophylactic in the eyes of the infant immediately after birth and to make a record of the prophylactic used. It is made the duty of a midwife in every case of childbirth under her care to use such prophylactic against inflammation of the eyes of the newborn as the State Board of Health requires.

*Oklahoma.* It shall be unlawful for any physician, or midwife, osteopaths and chiropractors practicing midwifery to neglect, or otherwise fail to instil immediately upon its birth, in both eyes of the newborn child a one per cent solution of nitrate of silver or other proven antiseptic, which shall be furnished by the State Board of Health in individual ampoules containing the proper solution and quantity for one treatment in both eyes. Should a physician or the parents of said child prefer to use a form of prophylaxis other than the one prescribed by above, he may do so provided that he states in writing his reasons for doing so to the local health officer of the county, city, town, magisterial district or whatever political division there may be within which the infant or the mother of any infant may reside, within three days from the date of administering same. Should a physician or the parents of said child deem it best for the interests of his patient, not to use any prophylactic, he shall not be required to do so provided that he states fully in writing, to the local health officer of the county, city, town, magisterial district or whatever other political division there may be within which the infant or the mother of any infant may reside, within three days from the birth of said child, his reasons for not doing so.

*Oregon.* Apparently no regulations except those making ophthalmia neonatorum a reportable disease.

*Pennsylvania.* Apparently no regulations except those making ophthalmia neonatorum a reportable disease.

*Rhode Island.* It shall be the duty of the physician, nurse or midwife attending the birth of an infant immediately after such birth to treat the eyes of such infant with a prophylactic remedy as may be recommended and furnished by the state board of health.

*South Carolina.* As soon as the child is born, two drops of a 1 per cent solution of nitrate of silver shall be dropped into each eye. (Sanitary code, regulations governing midwives—approved July 14, 1937. As in Maryland, there is no mention of prophylactic instillations by physicians.)

*South Dakota.* It shall be the duty of any physician, surgeon, obstetrician, nurse or midwife in attendance on, or having charge of a case of childbirth, to use immediately after the birth of the infant, for the prevention of ophthalmia neonatorum, such prophylactic measures as shall be approved for such purpose by the State Department of Health, unless specifically objected to by the parents or parent or guardian of such infant, and shall record in writing on the birth certificate of such infant the fact that such measures were or were not employed.

*Tennessee.* Apparently no regulations except those requiring that ophthalmia neonatorum be reported.

*Texas.* All doctors, midwives, nurses, or those in attendance at childbirth, shall use prophylactic drops in the child's eyes of a one per cent solution of silver nitrate or other prophylactic solution approved by the State Board of Health, to prevent ophthalmia neonatorum in the newborn, and said board shall furnish such solution or other prophylactic drops free of cost to the poor of the State, namely those upon whom it would work a hardship to buy the same.

*Utah.* It shall be the duty of such physician or midwife to treat the eyes of the child so afflicted in accordance with the rules of the state board of health. Every physician or midwife failing to comply with the provisions of this section is guilty of a misdemeanor.

*Vermont.* The State Board of Health may make such rules and regulations as it deems necessary for the prevention of blindness caused by the disease known as ophthalmia neonatorum, and it may furnish, at the expense of the state, such prophylactic outfits as are necessary for the use of physicians. A physician who fails to comply with such a rule or regulation shall be fined ten dollars for each offense.

*Virginia.* It shall be unlawful for any physician or midwife practicing midwifery in the State of Virginia, to neglect or otherwise fail to instil or have instilled, immediately upon its birth, in the eyes of the newborn babe, one or two drops of a solution prescribed or furnished by the Virginia State board of health.

*Washington.* State regulation requires the instillation of prophylactic drops in the eyes of the newly born.

*West Virginia.* It shall be unlawful for any physician, or midwife practicing midwifery, to neglect or otherwise fail to instil or have instilled, immediately upon its birth, in the eyes of the newborn babe, one or two drops of a one per cent solution of silver nitrate, furnished by the public health council. Every physician or midwife, shall, in making a report of a birth, state whether or not the above solution was instilled into the eyes of said infant.

*Wisconsin.* For the prevention of ophthalmia neonatorum, or blindness in the newborn babe, the State Board of Health shall, annually, cause to be prepared and put up in proper containers a one per cent solution of nitrate of silver with instructions for its use. These shall be distributed free to local health officers in quantities sufficient to enable them to, and they shall, deliver one to each physician and midwife. The attending physician or midwife shall use the said solution as directed in said instructions. In a confinement not attended by a physician or midwife, if one or both eyes of an infant become inflamed, swollen and red, or show an unnatural discharge, at any time within two weeks after birth, the nurse, parents, or other person in charge shall report the facts, in writing, within six hours to the local health officer who shall immediately give warning of the danger and a copy of said instructions, and shall employ at the expense of the city, town or village a competent physi-

tic of equal potency and harmlessness, except as hereinafter provided. It shall be the further duty of the attendant mentioned in Section 1 above to certify on the certificate of birth that the prophylactic treatment mentioned in Section 1 was actually applied as directed and to state what preparation was used for this purpose, except as hereinafter provided. Antiseptics of potency and harmlessness equivalent to a one per centum (1%) solution of silver nitrate, as provided in Section 1 hereof, shall be understood to be the following and no others: Twenty-five per centum (25%) solution of Argyrol, or five per centum (5%) solution of Protargol, or solutions of other silver compounds of equivalent strength and harmlessness to the eyes of the newborn.

*New York.* It shall be the duty of the attending physician, midwife, nurse, or other person in attendance on a confinement, to drop into both eyes of the infant immediately on delivery a one per cent solution of nitrate of silver, or some other agent equally efficient for preventing ophthalmia neonatorum.

*North Carolina.* It shall be unlawful for any physician or midwife practicing midwifery in the state of North Carolina to neglect or otherwise fail to instil or have instilled, immediately upon its birth, in the eyes of the newborn babe, two drops of a solution prescribed or furnished by the state board of health.

*North Dakota.* Duty of physician, midwife or other attendant. That whenever a child is born, the physician, midwife or any other person who is present and engaged as professional attendant, shall report said birth on a blank supplied by the state board of health to the health officer having jurisdiction, within thirty-six hours after such birth occurs. Said birth certificate in addition to other data ordered by the state board of health shall have upon it this question: "Were precautions taken against ophthalmia neonatorum?" And it shall be a violation of this act for any physician or midwife in professional attendance at a birth to fail to report same as herein commanded or to omit answering the said question, "Were precautions taken against ophthalmia neonatorum?" All bills or charges for professional services rendered at a birth shall be unlawful if report is not made as herein commanded. It shall be the duty of all physicians or midwives in professional attendance upon a birth to always carefully examine the eyes of the infant, and if there is the least reason for suspecting disease of the eyes then said physician or midwife in professional attendance shall apply such prophylactic treatment as may be recognized as efficient in medical science.

*Ohio.* It is the duty of physicians or others in attendance at childbirth in a maternity home, hospital, public or charitable institution to instil a prophylactic in the eyes of the infant immediately after birth and to make a record of the prophylactic used. It is made the duty of a midwife in every case of childbirth under her care to use such prophylactic against inflammation of the eyes of the newborn as the State Board of Health requires.

*Oklahoma.* It shall be unlawful for any physician, or midwife, osteopaths and chiropractors practicing midwifery to neglect, or otherwise fail to instil immediately upon its birth, in both eyes of the newborn child a one per cent solution of nitrate of silver or other proven antiseptic, which shall be furnished by the State Board of Health in individual ampoules containing the proper solution and quantity for one treatment in both eyes. Should a physician or the parents of said child prefer to use a form of prophylaxis other than the one prescribed by above, he may do so provided that he states in writing his reasons for doing so to the local health officer of the county, city, town, magisterial district or whatever political division there may be within which the infant or the mother of any infant may reside, within three days from the date of administering same. Should a physician or the parents of said child deem it best for the interests of his patient, not to use any prophylactic, he shall not be required to do so provided that he states fully in writing, to the local health officer of the county, city, town, magisterial district or whatever other political division there may be within which the infant or the mother of any infant may reside, within three days from the birth of said child, his reasons for not doing so.

*Oregon.* Apparently no regulations except those making ophthalmia neonatorum a reportable disease.

high fetal mortality, however, is due chiefly to tangling and knotting of the cords around each other and around the infants. True knots of the cords occurred in all of the 5 cases reported since 1935, even in the sets of living twins. Thus knotting of the 2 cords, usually causing fetal death of one or both infants, seems to be the common accompaniment of twins not separated by a membranous partition.

Recent observation of early embryos by one of the authors allows estimation of the time at which the fertilized ovum must have split to form 2 normal embryos within a single amnion. This estimation is arrived at as follows: The inductive force in the formation of the amnion is the presence of the embryo. Had the germ disc split before the formation of the amnion, presumably 2 amnions would then have formed in response to the presence of the 2 embryos. Therefore, at the time of amnion formation the split had not yet occurred. Since the amnion forms during the 7th to the 13th day following fertilization, the split could not have occurred before the 7th day. On the other hand, when the split occurred, the cells of the germ disc were sufficiently undifferentiated to form 2 equally potential halves. This is only possible before the germ disc shows a single axial arrangement, at which time the primitive streak simultaneously appears. These are first seen in the  $13\frac{1}{2}$ -day-old embryo. It is reasonably sure, therefore, that the split forming normal monoamniotic twins occurred sometime after the 7th and before the 13th days. Splitting of the germ disc before the 7th day should reasonably produce diamniotic twins, and after the 13th day, monoamniotic Siamese twins and monstrosities.

Two cases are here described, one from the Richardson House of the Boston Lying-in Hospital and the other from the ward service of the latter institution. They are of interest because there was no tangling or knotting of the cords, either together or singly, and as would be expected, both pairs of infants were born alive and survived, despite being monoamniotic. These are the third and fourth cases in American literature of double live-births; the second and third cases of double infant survival and the first two cases without tangling or knotting of the cords.

## THE UNDERNOURISHED FULL TERM INFANT

### *A Case Report*

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*Los Angeles, California*

West. J. Surg., 55, 363-370, 1947

According to the California State Board of Health, infants weighing 5 pounds 8 ounces or less must be listed as premature. The author has studied a series

cian to examine and treat the case as directed in said instructions. Any person who violates this section shall be fined not more than one hundred dollars.

*Wyoming.* It shall be the duty of every practicing or licensed physician in the state of Wyoming, when attending the birth of a child, to introduce or cause to be introduced into the eyes of the newborn infant a solution of a one or two per cent silver nitrate, or ten per cent argyrol or a one or two per cent protargol; provided, that this section shall not apply in cases where the parents are religiously opposed to the use of drugs and so state to the attending physician.—Ed.)

## MONOAMNIOTIC TWINS

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Am. J. Obst. & Gynec., 54, 119-123, 1947

Monoamniotic twins are of interest because of their extreme rarity and the high incidence of fetal death associated with this placental anomaly. In 1935, Quigley (Am. J. Obst. & Gynec., 29: 354-360, 1935) collected 109 cases from the world's literature, in only 17 of which both infants survived, although in 20 other cases one infant survived. This author added one new case in which one twin survived, this being the first case in American literature that had not ended fatally for both infants. Since 1935, 5 more cases have appeared in the English literature; 4 American and one British. Of these 2 resulted in twin live-births, although one twin of the first set died 30 hours after delivery. In the remaining 3 sets of twins there was one live baby and one anencephalic monster.

YEAR	AUTHOR	NUMBER OF CASES	DOUBLE LIVE-BIRTHS	SINGLE LIVE-BIRTHS	MONSTROSITIES
1700-1935	Quigley	109	17	20	8
1935	Rucker	1		1	
1935	Litt and Strauss	1			1
1936	Frewer	1	1		
1940	Parks and Epstein	1	1		
1942	Jones	1			
1945	Coulton, Hertig and Long	2	2		
Total .....		116	21	21	9
Per cent .....			18.9	18.9	7.8

According to Quigley, who discusses the possible mechanisms of development of monoamniotic twins, monstrosities occur frequently, 8 having been encountered in his series of 109. One is described in the 5 subsequent cases. The



AN INQUIRY INTO THE EPIDEMIOLOGY OF  
PEMPHIGUS NEONATORUM

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Brit. M. J., 2: 1-7, 1947

The authors have investigated an outbreak of pemphigus neonatorum and staphylococcal conjunctivitis affecting 132 infants in a large maternity unit over a period of 2 years. Serological identification of strains of *Staph. pyogenes* isolated from the lesions of all the cases showed that there were 3 outbreaks, each due to a distinct serological type of the organism; there was also a small number of sporadic cases due to different serological types of *Staph. pyogenes*.

Investigations in one large nursery in which 93 of the cases occurred showed that the infecting strain was widespread in the infants' environment, and was isolated from the noses of a high proportion of the nursing staff, from noses of healthy infants, from blankets and gowns, and from dust and air in the nursery. The findings indicate that the infants were infected in the nursery and not from their mothers.

The evidence suggests that the main reservoir of infection was the nasal passages of the nursing staff, whence infection was spread to the infants, probably via the hands.

Recommendations are made for the prevention and control of staphylococcal infection in infant nurseries. Overcrowding should be avoided, there should be adequate ventilation and natural light, and the nursery staff should receive early training in the nature, sources, paths of transmission and methods of prevention and control of hospital infections. The nursery should be cleaned by vacuum cleaner or damp dusting, the infants' bath should be thoroughly disinfected and washed after use of each infant. Changing of infants in their cots should be considered instead of on a communal changing-table. No member of the nursing staff should enter the nursery if suffering from any acute upper respiratory infection or skin sepsis. Masks, covering both nose and mouth, should be worn by all staff when in the nursery. Attention should be given to washing the hands, especially after every use of the handkerchief. Application of penicillin ointment to the nostrils may be effective for members of the nursing staff who are heavy carriers of *Staph. pyogenes*.

The numerous administrative and technical procedures necessary to prevent and control the spread of infection among infants in large nurseries give rise to consideration of the question whether the large infant nursery should not eventually be discarded in favor of mother and infant being nursed together in a cubicle or small wards. 2 figures.

of 6,641 babies delivered at the Good Samaritan Hospital at Los Angeles during a period of 44 months. From this number there were 69 babies weighing 5 pounds 8 ounces or less which were delivered at term. This is an incidence of 1.04 per cent. He believes that these babies are not premature but are undernourished. In this series of 6,641 deliveries the findings of the physician at the patients' first examination coincided with the period of amenorrhea. This makes the estimate of the infants' maturity fairly accurate.

The occurrence of the small babies was fairly evenly distributed among the various age groups. Small babies seemed to occur more frequently in primigravidae and primiparous women. About half of the cases studied occurred with the first pregnancy or with the first delivery. There was a reasonably widespread distribution of weights below 5 pounds; namely, from 3 pounds 12 ounces to 5 pounds 8 ounces. There were 5 in the series in which toxemia was present in a mild form in the mother. Four babies in the series showed abnormalities; one was born with spina bifida and meningocele and later died; another baby had legs of different lengths; a third child had a tracheal esophageal fistula; it died a short while after surgery; a fourth baby was born with hypospadias. The 3 deaths which occurred in the hospital resulted from erythroblastosis, subdural hemorrhage and icterus with atelectasis. There was such a widespread use of analgesic and anesthetic agents that primary asphyxia would mean little and have little or no effect on the subsequent condition of the babies. The number of cases in which at some stage of the pregnancy the uterus ceased to enlarge, the baby finally died in utero and was eventually stillborn, was not given. However, it is the author's personal opinion that lack of nourishment must be the factor inhibiting growth. If it is severe enough it will cause the death of the baby in utero, and if milder, will allow an undernourished baby to progress to term and to be born alive. Information as to the placentas in this series of cases was lacking except for five. However, it is McBurney's impression that the undernourishment of these babies may be due to insufficient food supply to the fetus because of a small placenta and that placental infarcts may or may not, depending upon how extensive they may be, have an effect on the baby. The mortality rate in this series seems to be no higher than in any series of normal newborn babies. The extrauterine hazards following the immediate shock of birth do not appear to be increased. There is no reason to believe that if a baby is born alive, but is undernourished at full term, it should not progress entirely normally. Three case reports in patients with toxemia are given in detail.

The infant was completely cot-nursed, with a radiant-heat cradle and continuous oxygen by tent. During the first 3 days she was fed by pipette 2-hourly on glucose water with one minim of brandy to one drachm. On the third day she was taking  $1\frac{1}{2}$  drachms of 1 in 8 expressed breast milk with glucose (1 drachm to 10 oz.) 2-hourly. The strength of the feeds was gradually increased; on the 26th day regular brandy with each feed was discontinued, and on the thirtieth day she took her first feed of 5 drachms of boiled breast milk from a Belcroy feeder.

At the end of the first week, the infant had maintained her birth weight, and in the next week she gained  $\frac{3}{4}$  oz. Six weeks after delivery she weighed 2 lb., 2 oz. She took her feeds well, although she occasionally had a slight cyanotic attack after a feed. After one severe attack, lobeline hydrochloride was injected into the right thigh, and 32 days after birth a small abscess developed at this injection site. The abscess was incised and penicillin therapy was given. The incision wound healed.

At 9 months of age the child gave the impression of being mentally in advance of her age and was formed like a child of 8 months. At 14 months of age she was discharged from a babies' hostel where she had remained since 21 weeks of age. Her weight at discharge was 17 lb., 5 oz. The writer has found no record of the survival of any child weighing less than 24 oz. at birth.

## THE CARE OF THE NEWBORN

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Practitioner, 159: 33-39, 1947

The obstetrician has not fulfilled the high functions of his art by "delivering a living child"; he must pass on to the pediatrician a human subject who will not be maimed or ill because of some error in obstetric technique or lack of appreciation of the factors in birth which can lead to serious or fatal illness. Care of the newborn infant begins in the antenatal period; nutrition of the mother will help secure a healthy mature infant, attention to the breasts and suitable propaganda will ensure breast feeding, and the early detection of toxemia will reduce the risk of prematurity, stillbirth or neonatal death from this cause.

During delivery, it can be remembered that even the mature infant is fragile, with bones which readily break, skin which is easily damaged, blood vessels the integrity of which is none too secure and a relatively large surface area from which heat loss can be considerable. It has been shown that neonatal pneumonia in the first 2 or 3 days of life is usually the result of inhalation of infected material by the fetus before or during birth. Good obstetricians will avoid the occurrence of fetal distress, and so reduce the risk of premature inspiration.

THE ROLE OF A PRESUMED SERUM PROTEIN IN THE  
PATHOGENESIS OF ERYTHROBLASTOSIS FETALIS

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Am. J. Clin. Path., 17: 465-468, 1947

From this study the authors conclude that there is no evidence for the presumed role of a so-called serum factor or X-protein in the pathogenesis of hemolytic disease of the newborn. Wiener, in attempting to explain the fact that in a large number of cases, hemolytic manifestations become apparent only after delivery, postulated that a serum component, the X-protein, formed only soon after birth, initiates the hemolytic process in the newborn. In the present paper, the authors sought to determine whether the property of serum to enhance the action of immune antibodies is present in fetal blood and in the blood of infants.

Serums from umbilical blood, infants of various ages and from adults were studied to ascertain their enhancing properties on various immune antibodies. Umbilical serums and serums of infants up to the age of 6 months were found to be devoid of enhancing properties. Serums of infants aged 6 months and over, as well as serums of healthy adults, of pregnant women, and of patients with hepatic disorders, were all found to enhance the action of various immune antibodies.

The writers state that we may accept the view that this enhancing property in mature human serum is due to some serum protein. Should we presume that this serum protein is able to cross from the maternal to the fetal circulation, it would still be difficult to explain the postnatal appearance of hemolytic manifestations in most cases of erythroblastosis fetalis.

## SURVIVAL OF A BABY WEIGHING 24 OZ. AT BIRTH

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Lancet, 1: 909-910, 1947

The case is recorded of the survival of a baby which weighed 1 lb., 8 oz. at birth. The mother was admitted to the hospital when 27 weeks' pregnant, with the diagnosis of inevitable abortion. Shortly after admission, a female child, presenting by the vertex, was delivered without incident. The infant was vigorous at birth and respirations were soon established after mucus had been cleared from the air passages.

of vomiting. If the baby has been retaining its feeds for a week or more and then begins to vomit, pyloric stenosis should be considered.

The author ennumerates the advantages of breast feeding over artificial feeding. After normal delivery, the baby should be put to breast after 6 hours for a minute or 2; after prolonged or difficult delivery, an interval of 12 or more hours should elapse. The practice of giving glucose solutions for the first 2 or 3 days has nothing to recommend it, and may even discourage nursing. Antenatal treatment of the breast and nipple of the primiparous woman is of great value toward successful nursing, but a proper understanding of the known factors of lactation in the early weeks after delivery is equally important.

Bleeding may occur in the first 5 days of life from the umbilicus, stomach or intestine, or within the cranium. When it is first noted, treatment with vitamin K should be instituted at once by the intramuscular route and then by the oral route.

So-called physiological jaundice is of no great significance. When it is of severe degree, a mercurial purge followed by the administration of glucose, calcium and an alkali are all that is necessary. In hemolytic disease of the newborn, usually due to rhesus incompatibility, the main features are severe jaundice with anemia, arising at or shortly after birth. Signs in aiding diagnosis are staining of the vernix, enlargement of liver and spleen and normocytic anemia with reticulocytosis and excess of normoblasts. As soon as a diagnosis has been made, and in severe suspected cases, treatment should be begun with transfusion of the infant with Rh-negative blood of compatible ABO group. Repeated small transfusions are preferable to occasional large ones.

Jaundice due to infection reaching the liver by the obliterated umbilical vessels usually arises during the first week of life and calls for appropriate treatment of infection. Congenital obliteration of the bile ducts and the familial acholuric jaundice are rare; there is no medical treatment for either condition.

The main principles in the care of an infant weighing less than  $5\frac{1}{2}$  pounds at birth are to maintain body warmth, avoid exposure, prevent infection, and to secure adequate nourishment, preferably with breast milk. It is essential to give smaller feeds at shorter intervals than in the case of a normal infant.

After birth, the baby should be wrapped to avoid exposure. When the cord has ceased to pulsate it should be cut, and the baby placed in a warmed bed. As a prophylaxis against gonorrhea, penicillin is effective and avoids the local reaction sometimes occurring with silver nitrate preparations. It is good routine practice to make a physical examination of the infant before transferring it to the nurse's care. The first toilet should be simple and gentle. Cotton-wool and olive oil can be used to remove the excess vernix caseosa. When the eyes have been treated with penicillin solution, the baby should be dressed in simple loose clothes; a simple bandage is all that is necessary to retain the cord dressing. The nursery should be warm and well ventilated at a temperature of 70 degrees F. for the first few days. The humidity of the room should be kept at about 60.

Sepsis neonatorum is recognized by a raised temperature, increased respiration rate, vomiting, diarrhea, irritability, weight loss, jaundice and the general features of toxemia; edema is often the sole manifestation of sepsis. Sepsis should not arise if proper precautions are taken, recognizing that the respiratory and alimentary tracts are obvious portals of entry, and that the umbilicus is a surgical wound. In the event of sepsis, sulfonamides and penicillin are effective when sensitive organisms are responsible.

Intracranial hemorrhage results from the misdirection of the natural uterine forces, or from gross trauma due to attempts to deliver the fetus, with or without forceps, in cases of disproportion. Precipitate delivery may result in multiple intracerebral hemorrhages or in a tentorial tear. The premature infant, due to its immaturity and the rigidity of the maternal tissues, is more liable to cerebral hemorrhage. Skilled application of forceps does not increase the risk of bleeding and may be responsible for the safe delivery of an infant who otherwise would have been subjected to unduly prolonged labor. Vitamin K should be given to an infant delivered by forceps or to one who has had a difficult delivery. Subdural hematoma carries a good prognosis, provided the diagnosis is made in time for surgical treatment.

The degree (and prognosis) of asphyxia depend upon the accessibility of the obstructing material to removal and the proportion of lung tissue which is incapable of functioning. In addition to the removal of mucus, the foot of the cot should be raised 6 inches and the baby's position changed every 15 minutes to ensure drainage. In cases of depression of the respiratory centre, lobeline intramuscularly, combined with administration of 93 per cent oxygen and 7 per cent carbon dioxide mixture by intranasal inhalation or oxygen tent, is indicated.

Vomiting in the newborn may indicate congenital obstruction of the alimentary tract. The diagnosis can be confirmed by X-ray examination, and a gastro-enterostomy should be performed, preferably under local anesthesia. A more innocent cause of vomiting in the neonatal period is the swallowing of uterine contents which apparently can cause local gastric irritation and pyloric spasm. Stomach lavage or administration of a barium meal often overcomes this type

collectively under total episiotomy blood loss. Except for a few designated cases, the infant was delivered slowly following birth of the head, a method advocated by Dieckmann. The method for acid hamatin extraction was as described by Dieckmann and Daily (*Am. J. Obst. & Gynec.*, **30**: 221, 1935), with the exception that the Coleman spectrophotometer Model 11 was used instead of the Duboscq instrument.

The results of this study indicate that total episiotomy blood loss may be considerable, and probably constitutes the chief source for blood loss in most primiparous patients. The average total episiotomy loss of 253 ml. is certainly high by comparison, since the uterine blood loss following intravenous ergotrate is reported as less than 100 ml. in 81 per cent of patients, and as low as 51.9 ml. following slow delivery and intravenous pituitrin and ergotrate.

Stuffing a Mayo sponge into the episiotomy wound during phase one does not significantly reduce the total blood loss or decrease that lost per minute. This practice only serves as a wick to soak up the blood, and probably deludes the operator into believing that less blood is lost. Some clinicians clamp and ligate bleeding vessels. But this procedure occupies valuable time, and the total amount lost is increased even though the loss per minute is less. Since the blood lost relates directly to time consumed, the amount of bleeding can be significantly reduced by shortening phase one. Episiotomy blood loss during this period can be as low as 46.5 ml.

A dramatic change occurs in the rate of episiotomy bleeding following delivery. The marked reduction in ml. lost per minute (50.1 ml. before delivery and 3.1 ml. after delivery in those without tamponade) has two probable explanations. The first concerns the effect of the infant's head and body, which acts as a tamponade during its passage through the introitus, and during which the ends of cut vessels are obliterated by pressure. The lower loss during outlet forceps supports this concept, as does the noticeably greater rate per minute following a faster delivery, when tamponade occurs for a shorter length of time. A second possibility concerns changes in venous circulation before and after delivery. Considerable venous congestion, as evidenced by protruding external hemorrhoids, promotes more bleeding prior to delivery. Whereas immediately after delivery circulation becomes reestablished between perineal venous plexuses and pelvic veins, and this congestion becomes relieved. Thus, much less episiotomy bleeding occurs during phase three. Thrombin, applied to the episiotomy with a Mayo-type sponge, was used on 10 patients. Blood loss during phase one was reduced and bleeding from that wound after delivery was lessened.

## OPERATIVE OBSTETRICS

### EPISIOTOMY BLOOD LOSS

LESTER D. ODELL AND ARTHUR SESKI

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*Am. J. Obst. & Gynec., 54: 51-56, 1947*

Few reports exist concerning episiotomy blood loss; Conn and co-workers, using a modification of Williams' method, reported average total blood loss of primiparas with episiotomy as 397 ml. and 189 ml. without, the calculated difference being 208 ml. Dieckmann and Daily employed the acid hematin method on 15 patients and found an average total blood loss (episiotomy plus uterine) of 342.3 ml. These same investigators noted a considerable variation in amounts of blood lost, and reasoned that a larger series would become of little additional value.

A total of 71 patients was selected for study. Each collection of blood was made with the patient in a lithotomy position, with a double thickness of waxed paper beneath the hips, and with the end of this paper directed toward a floor basin containing about 1,000 ml. 0.1 N hydrochloric acid. Episiotomies, performed with scissors, were all left mediolateral in location. The operation consisted of 3 incisions, as described by DeLee: an initial perineal incision, a second cutting intercolumnar fascia and thus exposing levators, and a third incising the vaginal mucosa. Delivery was completed with forceps following the episiotomy incisions.

Three phases of episiotomy bleeding were recognized: that phase from the initial incision until the infant's head distended the vulva and controlled bleeding; phase two, consisting of that time during which the infant is delivered; and phase three, that period after delivery until completion of the episiotomy repair. Significant bleeding occurs only during the first and third phases, and blood was collected separately for these periods. Furthermore, the elapsed times for phases one, two, and three were measured, and blood loss per minute calculated for periods one and three. Oxytocics, consisting of solution of intravenous pituitary or ergotrate or both, were administered during phase two to insure rapid placental detachment. And, following an early expression of the placenta, a tail-sponge was packed against the cervix to contain any additional uterine blood.

Three groups of patients were studied during phase one: those in which no tamponade was employed; another group in which a sponge was stuffed into the wound; and a third in which bleeding vessels were ligated prior to completion of the delivery by forceps. Ethylene-ether anesthesia was used for each group. Cases investigated under cyclopropane, ether, and spinal anesthesia are reported



the gas cases required considerable resuscitation, whereas only 2.5 per cent in the spinal group were difficult to resuscitate.

In the spinal group there were 9 breech deliveries and 191 vertex cases. Ninety-three per cent of the latter were prophylactic low forceps deliveries, the remainder being spontaneous. In the gas anesthesia group, there were 5 breech cases and 22 per cent of the vertex cases were spontaneous deliveries. The minimal amount of uterine bleeding in the spinal cases was almost phenomenal. The average estimated blood loss in the spinal cases was 170 cc.; in the gas cases it was 280 cc. In a few cases spinal anesthesia seemed to weaken somewhat the uterine contractions, thus prolonging labor.

Best results are obtained with spinal anesthesia if the dose of the anesthetic agent is small and given in dilute solution. The importance of adequate oxygenation of the patient is emphasized.

## MYOMECTOMY DURING PREGNANCY: CASE REPORT

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Harper Hospital Bulletin, 5: 76-79, 1947

The incidence of clinically significant fibromyomata complicating pregnancy has been variously estimated. Mussey and Hardwick believe that for the entire country one per cent or less is a fair estimate (*Am. J. Obst. & Gynec.*, 29: 192, 1935). Of the 297 cases reviewed, one third were considered clinically significant because of their location, size or symptoms. Myomectomy was performed in 32, with miscarriage or premature labor following in 15.

In a very thorough study of the subject Thompson concludes that (a) there is less risk with small fibroids than with large; (b) the history seems a more important indicator than the size of the tumors; (c) pain and tenderness presage trouble; and finally (d) one should not urge the removal of a uterus with fibroids in a woman who desires children (*West. J. Surg. Obst. & Gynec.*, 49: 527, 1941). Willson reports 53 cases of pregnancy complicated by uterine fibroids (*J. Mich. State Med. Soc.*, 40: 795, 1941). While symptoms of degeneration occurred in 12.5 per cent, all were carried to term without operation. The incidence of operative deliveries was 22 per cent.

Eighteen myomectomies performed during pregnancy by Reis and Sinykin without mortality and with only 2 miscarriages prompted the following observations: (a) The indications for myomectomy are acute degenerative changes, hemorrhage, infection, twisted pedicle, or rapid growth together with encroachment upon the birth canal. (b) The best results are obtained by minimal handling of the pregnant uterus; myomectomy with the uterus in situ, if possible; complete avoidance of the uterine cavity; careful hemostasis and peritonization; removal of only the guilty fibroid. (c) Myomectomy during pregnancy is a comparatively safe procedure for both mother and the fetus and

## POSTPARTUM RESULTS OF SPINAL ANESTHESIA IN OBSTETRICS

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Anesth. &amp; Analg., 26: 114-121, 1947

The postpartum results of 200 consecutive cases of spinal anesthesia for vaginal delivery have been carefully studied and compared with a similar series of 200 consecutive cases of gas anesthesia (cyclopropane or nitrous oxide followed by cyclopropane). For spinal anesthesia 5 or 6 cc. of 1 per cent procaine in saline solution (50 to 60 mg.) was injected through the third or fourth lumbar interspace into the subarachnoid space. Prior to and during delivery, the mother was given oxygen by face mask, and if she was nervous, small amounts of cyclopropane were added during actual delivery. Cyclopropane was added in this way in 42 per cent of the spinal group. In the gas cases, either nitrous oxide and air, in the modified Sword technique, followed by cyclopropane and oxygen for actual delivery, episiotomy and repair, or straight cyclopropane and oxygen for delivery, episiotomy and repair was used.

The importance of qualified medical anesthetists with some clinical experience in obstetrics and psychology, is stressed. All anesthetics in the present study were given by qualified physician anesthetists.

The results are classified according to their value to the mother, the child, the obstetrician and the anesthetist. As regards the mother, one of the commonest sequelae observed in the postpartum period was headache. Grade I, called minor headache, was usually a dull frontal distress which did not recur more than 3 times during the first 10 days. Grade II, called notable headache, was quite disturbing to the patient, recurred intermittently for from one to 4 days with decreasing severity, and then cleared up completely. Grade III, called severe headache, included the so-called spinal headache. It was noted that headache occurred just as frequently after gas anesthesia as after spinal anesthesia. The incidence of grade II headache was higher after spinal than after gas anesthesia, but there were no cases of severe headache. It was found that the incidence of headache was equal among patients who remained "flat in bed" for 24 hours after delivery and those who moved as freely in bed as they desired.

Nausea and vomiting occurred in 20 per cent of the gas cases, but always before the patient left the delivery room. Nausea and vomiting in the spinal anesthesia group was rare and slight, and never a hazard in the conscious patient. In the entire study there was no aspiration pneumonitis or other respiratory complication, no infection at the site of lumbar puncture, no involvement of the meninges, and no injuries to spine or nervous system. There was little change in blood pressure in the spinal cases and no actual circulatory depression.

Of the babies delivered with the use of spinal anesthesia, 96.5 per cent breathed spontaneously and required little or no resuscitation. The corresponding incidence in the gas cases was 90 per cent. However, 10 per cent of the infants in

**Pathological report:** The gross specimen consists of a 16 cm. diameter encapsulated mass of pinkish white fibrous tissue arranged in whorls. Hemorrhagic areas and areas undergoing degeneration are present.

**Microscopic:** Degenerating fibromyoma of the uterus.

The patient was discharged on the 13th postoperative day and the prenatal course to term was uneventful. She was admitted in labor on March 22, 1947 and a low cervical cesarean section was performed under spinal anesthesia. On opening the abdomen there were a few omental adhesions attached to the myomectomy scar. The uterus contained nine small fibroids from 1 to 4 cm. in diameter. A normal 7 pound 4 ounce male infant was delivered. The placenta was found on the posterior wall and removed. The previous myomectomy scar was inspected and found to be about 1.5 cm. thick over this area. The uterus and abdomen were closed in the usual manner as 500 cc. of whole blood were given. She was returned to her room in good condition.

This report is given in detail because it brings up many points for discussion. It presents a case where interference was clearly indicated because of the rapid growth and degeneration of the tumor. The degeneration was evidenced by the severe pain and tenderness in the tumor mass, the toxic condition of the patient, leukocytosis with toxic granulation of segmented forms and the elevation of temperature. The report further bears out the conclusions of Thompson, that there is more risk with large than with small fibroids; that pain and tenderness presage trouble and that it is not always necessary to remove a uterus even though it contains large fibroids. At the time of the myomectomy, the uterus was incarcerated and the patient was threatening to miscarry as evidenced by the regular contractions. It is significant that the uterine cavity may be invaded to a considerable extent without producing miscarriage. The fibroids undetected at the time of the myomectomy increased considerably in size during the  $4\frac{1}{2}$  month interval between the 2 operations but the patient complained of no pain or symptoms suggesting degeneration.

(Waggoner is to be congratulated on the happy outcome of his spectacular case because, in general, the frequency of abortion after myomectomy in pregnancy is in direct proportion to the degree in which the uterine cavity is encroached upon or invaded. We rarely perform myomectomy in pregnancy and are not very enthusiastic about it for a number of reasons:

1. It is rarely necessary. In a considerable experience with myomata in pregnancy, especially in negroes, we know of no incidence in which our failure to perform myomectomy was later regretted. Although the symptoms of degeneration, such as pain, tenderness, etc., are frequently seen and may even simulate in their severity an acute abdominal calamity, they almost invariably subside after a day or two of rest and sedation. Of course, torsion of a pedunculated myoma or a degeneration plus actual infection, calls for interruption but in our experience such complications, particularly the latter, are very rare.

2. The incidence of abortion following myomectomy in pregnancy is of the order of 40 or 50 per cent, the experience of Reis and Sinykin being a notable exception (*Am. J. Obst. & Gynec.*, 37, 834, 1939).

3. A more than negligible number of myomectomies in pregnancy end up as hysterectomies because of uncontrollable bleeding.—Ed.)

should be performed promptly whenever indicated (Am. J. Obst. & Gynec., 37: 834, 1949).

The following case is reported in some detail because it illustrates a number of important points:

Mrs. M. D., aged 25, para 0, gravida 1, whose last menstrual period was June 24, 1946, was first seen September 16, 1946. Her complaints were not unusual for early pregnancy. The past history was noncontributory.

The general examination was normal except for a mass in the lower abdomen extending to about 4 cm. below the umbilicus. On vaginal examination the uterus was found in the pelvis with a firm, slightly tender 8 cm. mass on the anterior wall.

On 2 subsequent visits the tumor mass was found to be enlarging rather rapidly. October 26, 1946 the patient reported that she was having low back-pain and intermittent abdominal cramps. Bed rest and sedation were instituted but after 2 days without relief she was hospitalized. At this time she had constant pain below and to the left of the umbilicus, and intermittent cramp-like pain in lower abdomen. There was nausea and vomiting, the temperature was 100°F., the pulse rate 94, and palpation of the lower abdomen revealed a tender, firm mass extending to 3 cm. above the umbilicus. The cervix was found under the symphysis pubis, pointing upward and undilated. The blood count showed RBC 4,320,000, WBC 14,750, with neutrophils 92 per cent, lymphocytes 7 per cent and eosinophils 1 per cent. A catheterized urine specimen showed 40-50 WBC/hpf and 15-18 RBC/hpf.

The evidence pointed to the existence of a large degenerating fibroid complicating a 4 months pregnancy and threatening abortion. Acute cystitis was also present. Expectant treatment was instituted and when no improvement followed in 24 hours, laparotomy was performed under spinal anesthesia. On opening the abdomen the uterus was found incarcerated in the pelvis with a large fibroid in the anterior wall near the left cornu. In making an incision and enucleating a 16 cm. fibroid, about 7 cm. of the uterine cavity was exposed and the membranes bulged into the incision so that the fetus was clearly visible. The incision was closed by 4 layers of interrupted zero chromic catgut sutures. It was necessary to depress the membranes while the first layer of sutures was being placed. Very little bleeding was encountered and was readily controlled. A small 2 cm. pedunculated fibroid was then excised from the posterior wall of the uterus. Five hundred cc. of whole blood was given during the operation. The abdomen was closed in layers without retention sutures being used and a retention catheter placed in the bladder.

Postoperatively 2 mgm. of progesterone and 500 mgm. ascorbic acid were given daily, and 7.7 gr. sulfadiazine given 4 times daily because of the cystitis and the use of a retention catheter. This was removed on the third day. Twelve hours after operation the patient noted quickening, and on the fourth day uterine contractions of 15 seconds duration occurred at 8 minute intervals, but ceased after resuming morphine sulfate gr. 1/6 every 4 hours. The blood count on November 6th showed RBC 3,560,000, Hgb. 70 per cent and WBC 9,300. The urinalysis was negative.

more approving than in the case of recent pelvic operations, general debility and anemia, and venereal disease.

(8) Half of the respondents prescribed contraceptives frequently, while another one quarter prescribed them occasionally.

(9) The method preferred by most of those prescribing was the diaphragm with jelly or cream. The condom was given undisputed second choice. Next in popularity were rhythm and jelly or cream alone. Abstinence, intra-cervical stem pessary, withdrawal, suppositories, foam powder and sponge were very rarely prescribed.

(10) The frequency with which a method is prescribed was the product of 2 factors, trustworthiness and patient acceptability; the doctor often compromising with the former because of the latter.

## SOCIAL AND LEGAL ASPECTS

### CONCEPTION CONTROL AND THE MEDICAL PROFESSION

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Human Fertil., 12: 1-10, 1947

In an attempt to determine what the doctors of the United States actually think and do about contraception a questionnaire was sent to 15,000 physicians, approximately 6,000 gynecological and obstetrical specialists and 9,000 general practitioners. The latter were selected according to geographic area and community size, to obtain a cross-section survey of the whole country. There were 3,381 completed replies and upon this sample the study is based. After careful analysis it is felt that the sample is representative and not selective; though this premise cannot be incontestably proved.

The following conclusions were reached:

(1) The teaching of contraception in medical schools is inadequate. Three quarters of the respondents received no medical school instruction in conception control. However, such instruction is being added to curricula as shown by contrasting the training received by recent graduates to that of earlier graduates.

(2) Demands were made on 9 out of 10 respondents for contraceptive advice; upon 6 of the 10 the demand was made frequently.

(3) Child spacing, economic pressure and the desire for family limitation were the 3 commonest reasons for patients to seek contraceptive advice.

(4) A list of 12 medical problems were presented and the physicians asked for which they approved of contraception. The highest score of approval was given cardiac disease; the other 11 ranked as follows: pulmonary, renal, nervous and mental, great multiparity, hypertension, diabetes, exophthalmic goitre, prevention of inherited disease or malformations, recent pelvic operation, general debility and anemia, and venereal disease.

(5) More than 80 per cent approved of contraception for child spacing. The younger physicians and those residing in the West were the most liberal in their attitude toward this and all other aspects of conception control covered in this survey.

(6) The average minimum safe interval between children was considered to be 23 months by the respondents. They also felt that 6 months should elapse between a spontaneous abortion and the initiation of another pregnancy.

(7) The doctors were almost as approving of contraception for economic reasons and marital adjustment as they were for medical indications, in fact

more approving than in the case of recent pelvic operations, general debility and anemia, and venereal disease.

(8) Half of the respondents prescribed contraceptives frequently, while another one quarter prescribed them occasionally.

(9) The method preferred by most of those prescribing was the diaphragm with jelly or cream. The condom was given undisputed second choice. Next in popularity were rhythm and jelly or cream alone. Abstinence, intra-cervical stem pessary, withdrawal, suppositories, foam powder and sponge were very rarely prescribed.

(10) The frequency with which a method is prescribed was the product of 2 factors, trustworthiness and patient acceptability; the doctor often compromising with the former because of the latter.

## BOOK REVIEW

THE ROTUNDA HOSPITAL, 1745-1945. By O'Donel T. D. Browne, M. B., M. A., M. A. O. (Univ. Dub.); F. R. C. P. I; F. R. C. O. G., Litt. D. The Williams & Wilkins Company, Baltimore, 1947. 296 pages. \$11.00.

On March 15, 1745, Bartholomew Mosse opened the Dublin Lying-In Hospital for Poor Women in George's Lane. It was his beneficent intention to provide comfortable accommodations and obstetric succour for those whose lodgings were "generally in cold garrets open to every wind, or in damp cellars subject to floods from excessive rains; themselves destitute of attendance, medicines and often proper food; by which hundreds perish with their little infants, and the community is at once robbed of mother and child." For 200 years the Governors and Guardians, and the Masters of the hospital have fulfilled the Founder's wishes in a way which would delight his heart, but they have done much more. They have created a school of obstetrics whose annals are rich in eminent contributions and whose successive Masters have been world leaders. Over the years, furthermore, countless hundreds of doctors, students and nurses have sat at the feet of these masters and have carried their wholesome teachings to the ends of the earth. Hence, the founding of the Rotunda was an epochal milestone in the history of obstetrics; and it is highly appropriate that its bicentennial should be marked this year not only by an International Congress in Dublin but also by the publication of this volume.

Written by an ex-Assistant Master of the Rotunda, the book is both scholarly and intensely interesting. The first half is devoted to the successive Masters and their contributions. Here the greatest space is naturally devoted to Mosse, the hero of the story. At a time when no like institution existed in the world, he saw the pressing need for a maternity hospital open to the destitute, and despite lack of money, lack of precedent and seeming lack of almost everything except determination, he somehow succeeded in establishing it and left it upon his death a going concern. Financial difficulties bedevilled him incessantly and throughout the long history of the institution all kinds of expedients, including lotteries, have had to be utilized to make ends meet. The very name "Rotunda" was the outcome of one of these expedients, namely, the erection in 1767 of certain "round rooms" which were rented out for private receptions and balls. Dr. Browne's account of Mosse leaves with the reader a vivid impression of this great pioneer. His direct contributions to the science and art of obstetrics *per se* were avowedly meagre, but through the instrumentality of the hospital he founded, his influence is world-wide and abiding.

If the first Master of the Rotunda was a great organizer and philanthropist (in the true sense of the word, for he himself was almost penniless), its second Master, Sir Fielding Ould, was one of the greatest of clinical obstetricians. His "Treatise on Midwifery," his observations on the mechanism of labor, his descriptions of the third stage, his recommendation of episiotomy and his astute nota-



tions on the growth and thickening of the uterine wall during pregnancy, were original contributions of the first order. Curiously enough he was the subject



FIG. 2. AN ENGRAVING OF MOSSE, THE FOUNDER OF THE ROTUNDA HOSPITAL, WITH HIS SIGNATURE. (COURTESY OF DR. O'DONEL BROWNE.)

of some of the most famous doggerel in the history of our specialty. Thus, when he was knighted in 1760, the following appeared in a local medical journal:

"Sir Fielding Ould the sword of knighthood gained  
For saving ladies' lives in childbed pained."

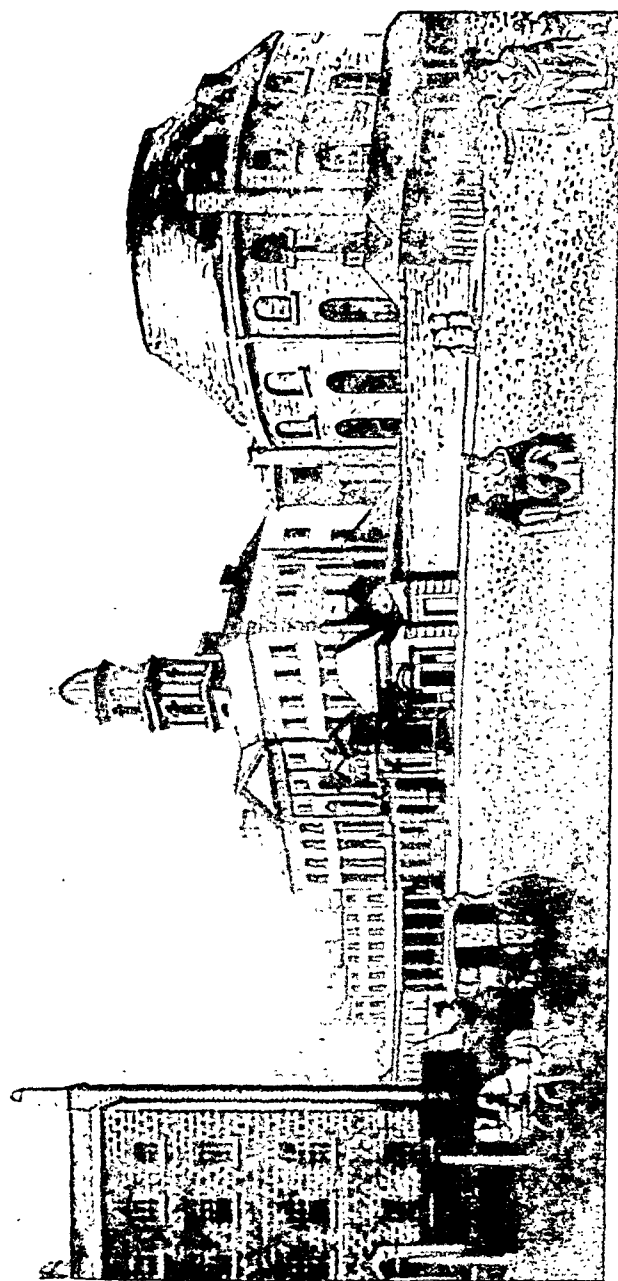


FIG. 3. THE ROTUNDA HOSPITAL AND ROUND ROOMS, ABOUT 1785. (COURTESY OF DR. O'DONEL BROWNE.)

Later followed the better known:

“Sir Fielding Ould is made a knight,  
He should have been a lord by right;  
For then each lady’s prayer would be,  
O Lord, good Lord, deliver me!”

The characteristics and contributions of the subsequent Masters are reviewed by Dr. Browne with a wealth of anecdote, statistical data and other interesting details. Although selection was difficult he lists as the greatest Masters: Mosse, Ould, Clarke, Labatt, Collins, Macan, Smyly and Tweedy. Maternal and fetal mortality rates are cited for the period of each Master and are surprisingly low. Intriguing expense accounts are given for some of the earlier years. The main item was coal but the second, as a rule, was small beer and whisky,—72 gallons of the latter being purchased in 1777. As the author points out, whisky was used extensively in the treatment of puerperal infection in those days.

The second half of the volume is devoted to specific obstetrical conditions and here the experience and contributions of the Rotunda are set against the picture in the obstetrical world at large. This means that this section covers in considerable detail the major advances in obstetrics during the past two centuries. For instance, in a long section on the everlasting scourge of puerperal infection, the entire story is reviewed as it unfolded in Vienna, Boston, Edinburgh, Dublin etc. Operative obstetrics, anesthesia and eclampsia are surveyed from the same broad viewpoint. All this is summarized at the close of the volume by chronological listings of the developments at the Rotunda under each Master followed by a synopsis for the respective periods of main events in the obstetrical world elsewhere.

Most histories of medical institutions tend to be a trifle boring except to the members of the particular establishment concerned. Both because of the subject matter and the way it is handled, this book is different; and obstetricians everywhere will find difficulty in putting it down once they have delved into its pages. The format is pleasing, photographs of the Masters and buildings are plentiful and attractive and, all in all, the volume is well worthy of the noble hospital it chronicles.

—EDITOR

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# Maternal Mortality Reports

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*(Secretaries of Maternal Mortality Committees are invited to submit selected cases of maternal deaths, with analyses appended, for publication in this section of the Survey. Cases should be chosen on the basis of educational value, not because of rarity. For obvious reasons complete anonymity will be maintained. Readers should note that the comment which follows each case history represents the opinion of the Committee concerned and does not necessarily reflect the attitude of the Editors.)*

## RUPTURE OF THE UTERUS\*

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The source of the material in this presentation is the data given in the Pennsylvania Maternal Welfare Survey forms, each of which reviewed a maternal death and the cause of death was given as rupture of the uterus. Thirty-three such maternal deaths will be analyzed.

In this series there were 8 primigravidas, ages 19, 21 (two), 23, 24, 25, 30, and 42; there were 5 Para I, ages 23, 24, 29, 33, and 37; there were 5 Para II, ages 24, 27, 28, 29, and 35; there was one Para III, age 37; there were 14 multiparas (Para V to XII) whose ages ranged from 28 to 45.

Of the eight primigravidas, when and why did the rupture occur?

CASE 1: Age 23; twenty-four hours of labor; right occipitoposterior position, high in midpelvis; version and extraction at 10 p.m.; died at midnight.

CASE 2: Age 30; two years previously had salpingo-oophorectomy; two injections of pitocin, 3 minims, given early in labor; ten hours later patient had severe contractions, and two hours later showed signs of internal hemorrhage; manual dilatation of cervix and version were done. Patient died on the table; autopsy revealed rupture at site of scar of tubal resection.

CASE 3: Age 21; rupture of cornual pregnancy of four months.

CASE 4: Age 24; delivered at home by version and extraction. Admitted to hospital "in extremis" on second day after delivery.

CASE 5: Age 42; admitted to hospital one day after delivery. Patient had had ten-hour labor with no progress and  $\frac{1}{2}$  cc. of pituitrin was given. She was delivered by low forceps and went into "shock" immediately; in twenty-four hours a hysterectomy was done for rupture and she died twenty-four hours postoperatively.

CASE 6: Age 25; persistent right occipitoposterior position; difficult Simpson forceps delivery in hospital; patient died twenty-four hours postpartum.

CASE 7: Age 21; transverse position with prolapsed arm at term. Patient was delivered in hospital after nine hours of labor, version, and extraction; she died twelve hours postpartum.

CASE 8: Age 19; breech presentation; delivered at home four days before admittance to hospital; retained placenta removed manually at home. On admittance to hospital the patient was septic and autopsy showed a ruptured uterus.

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\* An excerpt of the major portion of an article published in the Pennsylvania Medical Journal, May 1947, Vol. 50, pages 801-807. (Courtesy of Dr. Taylor.)

Here are the cases of 8 primigravidas, in whom there were four versions and extractions (one also having a scar from salpingectomy where rupture occurred); one was a ruptured cornual pregnancy, in whom  $\frac{1}{2}$  cc. of pituitrin was given followed by low forceps delivery and immediate shock; another one presented a difficult nonrotated posterior position and was delivered by Simpson forceps, and one probably ruptured because of manual removal of retained placenta. Three of these eight patients had operative deliveries in the home; one was a breech extraction with manual removal of the placenta, one was given pituitrin ( $\frac{1}{2}$  cc.), and one was a case of podalic version and extraction; all three of these patients were within easy transportation to a hospital for consultation and delivery assistance. Again it is stressed that the home is no place for operative obstetrics any more than the home is any longer the place for acute abdominal surgery.

A glance at the data on Para I, II, and III, totaling 11 cases, gives the following data:

CASE 9: Age 33, Gravida II, Para I. Presenting part was high and there was no dilatation after eight hours of active labor. Following accouchment forced in the home, delivery was spontaneous eleven hours later. The patient died six days postpartum; autopsy showed rupture and peritonitis.

CASE 10: Age 37, Gravida II, Para I. Cesarean section (type unknown) was performed six years previously with trial of labor given. Patient was admitted to hospital with membranes ruptured, contractions every seven minutes, and vertex at vulva after seven hours of labor; she was given spinal anesthesia at this stage. The blood pressure dropped to 70/40 and fullness of the lower uterine segment was noted with violent uterine contractions. A stillborn infant was delivered, and one hour later the patient was taken to the operating room where rupture through a Kerr type of incision was found.

CASE 11: Age 23, Gravida II, Para I (section two and a half years before for eclampsia). Planned a repeat section, but patient contracted a severe influenzal infection at elected time and labor began; after eighteen hours of labor, the cervix was dilated 4 cm.; rupture of the scar occurred the twenty-first hour and operation was done within one hour.

CASE 12: Age 28, Gravida III, Para II. Previous deliveries were spontaneous. There was bleeding evidently from abruptio placentae at term. Following Braxton Hicks version, with cervix dilated 4 cm., the patient expelled spontaneously a stillborn baby five hours later. She died from hemorrhage three hours later, and autopsy showed complete rupture of the uterine segment.

CASE 13: Age 29, Gravida III, Para II. Normal deliveries previously. In this pregnancy intra-uterine fetal death occurred before labor, at term; there were four days of irregular labor; the "forceps slipped off," then podalic version was done in the home. There was excessive bleeding, and four days postpartum the patient was admitted to the hospital where a diagnosis of peritonitis from a ruptured uterus was proved at autopsy.

CASE 14: Age 35, Gravida III, Para II. Patient had two stillborn infants, each weighing 10 pounds. With the first the patient had four hypodermic injections of pituitrin and it was with this labor probably that rupture first occurred. Also with this labor (twenty-six and one-half hours) midplane forceps were used; the  $10\frac{1}{2}$  pound baby was stillborn. The patient at time of labor was suffering from coryza, hypertension, and overweight (220 pounds). Autopsy revealed a rupture of an old healed rupture.

CASE 15: Age 27, Gravida III, Para II. Both previous deliveries were spontaneous with stillborns. Twenty days after term, delivery of the third baby, a breech presentation, was attempted at home. Patient was admitted to hospital in shock from a rupture.

CASE 16: Age 24, Gravida III, Para II. Both other deliveries were "hard." Patient

was in labor at home forty-eight hours and received several doses of pituitrin; on admission to hospital was fully dilated, and version and extraction were done; also adherent placenta was manually removed and a rupture was found.

CASE 17: Age 37, Gravida IV, Para III. Previous labors were long and deliveries difficult; all babies were alive. Low forceps extraction was attempted after thirty-six hours of labor and version failed. Patient died on the sixth day from peritonitis following a proved rupture.

CASE 18: Age 29, Gravida II, Para I. Three years previously had a classical section for mitral stenosis. In eighth month of present gestation the uterus ruptured with no evidence of labor. Patient was admitted to hospital as an emergency case and a cesarean section was performed (obtaining live baby through uterine rupture), but she died of sepsis on the twelfth postoperative day.

CASE 19: Age 24, Gravida II, Para I. Two years previously had a cesarean section after forty-eight hours of labor with no engagement. The 10-pound infant was stillborn—probably a case of disproportion. This pregnancy was to terminate by elective cesarean section. Patient was admitted to hospital two weeks prior to expected date for section in the morning; the fetal heart sounds were O.K. The patient was not in labor, was in good condition at 8 p.m., at midnight, and at 2 a.m., and showed no signs of impending rupture. The private duty nurse and intern were warned to be on the lookout for signs of rupture, just as precautionary measures. At 4 a.m. the patient was awakened by severe lower abdominal pain; the nurse disregarded warnings and the intern or physician were not notified until 7 a.m. At 7:30 a.m. the patient showed all the typical signs of intense shock with no fetal heart sounds or movements. Plasma was started and continued until 9 a.m., when the patient was removed to the operating room where the whole classical section scar was found wide open, the membranes ruptured, and the fetus free in the peritoneal cavity. A rapid hysterectomy was done, but the patient died while the incision was being sewed.

What can be gathered from an analysis of the foregoing Paras I, II, III totaling 11 cases?

There were three ruptures after previous sections. There was one spontaneous rupture after an eleven-hour labor with easy delivery; the case review gives no clue as to why the rupture occurred. There was one Braxton-Hicks version (with 4 cm. dilatation) done for abruptio placentae. There were two podalic versions, one being done on a stillborn in the home after forceps delivery was attempted. There was one breech delivery in the home twenty days after term, the patient having had two previous stillborns from long hard labors. There was one rupture which occurred at the probable site of a previous rupture several years previously. There was one other forty-eight hour labor with injections of pituitrin (after two previous hard deliveries) on which a version was done. The question here is whether the pituitrin or the version was the real factor.

Case 19 was a personal case and her rupture gave absolutely no warning signs until the actual rupture occurred. The nurse absolutely was negligent in failing to notice the change in the patient, to recognize signs of shock, or to report same to her supervisor and ask for help. Last of all, she failed to notify the obstetrical intern or the staff physician (myself in this case) and noted only that the patient had a pain at 4 a.m. and at 7 a.m. she was restless. This was purely a case of nurse negligence and an unnecessary death, as warnings had been given and there was no excuse for the long delay which spelled defeat for the patient.

A careful study of the above cases shows instances of failure to evaluate pre-

vious obstetrical history and to exercise good obstetrical judgment. Also shown are the dangers of home deliveries in difficult cases as well as the injudicious use of pituitrin. How many of these eleven should be classified as preventable? I shall leave that decision for each one of you to make.

Under the arbitrarily chosen division of these cases according to parity (primigravidas and Para I, II, and III), both of which classifications have been analyzed, there remains for analysis the multipara class (Paras V to XII), of which there are 14 cases. In this group of multiparas the ages range as follows: one was 28 years of age, one was 35, eight from 36 to 40 inclusive, and four from 41 to 45 inclusive; thus thirteen of this group were 35 years or more of age.

CASE 20: Age 41, Gravida VIII, Para VIII (one set of twins). No operative deliveries. Medical induction of labor was attempted with pituitrin in small divided doses one month before time. The weight was 270 pounds, the blood pressure 158/110. After eight hours of labor (three in the home) there was vaginal bleeding with a tender uterus. The diagnosis was abruptio placentae. The patient was beginning the second stage of labor when manual extraction of a simple footling (4200 Gm.) was done, which was very difficult. The bleeding continued, and after the placenta was manually removed, rupture was diagnosed.

CASE 21: Age 37, Gravida VIII, Para VII. All previous deliveries were spontaneous with no complications. This baby was in a transverse position with impacted shoulder and prolapsed arm. The patient, bleeding freely, was taken twenty miles to the hospital, being admitted with the above-mentioned condition and Bandl's ring. Delivery consisted of version, manual extraction, and the application of forceps to the aftercoming head.

CASE 22: Age 39, Gravida XII, Para XI. All previous deliveries were spontaneous. The membranes ruptured and there was some bleeding two days before admittance to hospital (patient refused hospitalization until after labor started two days later). She was seen by the physician for the first time one-half hour after the start of labor. He found the baby in a transverse position with a shoulder presenting and a prolapsed arm. Patient was admitted to hospital three hours later with arm visible at outlet. While being prepared for delivery, one-half hour after admission, the patient had terrific pain and collapsed with a terrifying cry. Plasma was started and she was taken to the operating room, where one hour later a hysterectomy was done for complete rupture extending the length of left side of uterine body and severing the left uterine artery.

CASE 23: Age 38, Gravida VIII, Para VI. All previous labors were spontaneous, although patient had one septic abortion. The membranes ruptured forty-eight hours following admittance to hospital after the patient was in labor an indefinite time with the baby in a transverse position and after having received one injection (dose unknown) of pituitrin three hours after the start of labor. Manual extraction was attempted in the home, but the patient was sent to the hospital with a temperature of 101 and pulse 100. A hysterectomy was performed. The patient died of peritonitis.

CASE 24: Age 45, Gravida XIII, Para VIII. The first delivery was by classical section sixteen years before for eclampsia. There were 2 miscarriages, 2 stillbirths, and 6 living children from spontaneous deliveries. Patient was admitted to hospital four hours before rupture, being in moderate labor. The membranes ruptured, but there was no dilatation. She went into severe shock and died without any operation or obstetrical treatment other than for shock.

CASE 25: Age 40, Gravida X, Para IX. Patient had 2 stillborns from unknown causes and 7 spontaneous deliveries. She was admitted to the hospital forty-eight hours after the start of labor with severe upper right abdominal pain. The membranes ruptured at the start of labor; there were no fetal heart sounds. The head was high and not engaged. Fetus was in a transverse position with prolapsed cord. Version was done and a 10½ pound macerated fetus was extracted.

CASE 26: Age 35, Gravida IX, Para VIII. Seven previous deliveries were normal; one was by classical section for placenta praevia. The patient had seen no physician in this pregnancy until four hours after the onset of labor. She was admitted to the hospital in shock five hours after labor began and died before surgical or obstetrical treatment could be instituted.

CASE 27: Age 43, Gravida IX, Para VII. All previous deliveries were spontaneous; there was one abortion. After three hours of labor in the home, the membranes ruptured and an arm and the cord prolapsed. Version was attempted and she was given "several injections into arm to help her labor." For one and one-half hours home delivery was attempted, after which time the patient complained of severe and constant pain in the right lower quadrant. She was admitted to the hospital in shock, and no uterine contractions were felt. The fetus and placenta were manually extracted. The patient died three hours after admission.

CASE 28: Age 28, Gravida VII, Para VI. All previous deliveries were normal. There was no antepartum care in this instance, and labor started at term. The bulging membranes ruptured after four hours' work by the physician and the cord prolapsed. After six hours the patient was given  $\frac{1}{2}$  cc. of pituitrin which "resulted in terrific pain but no progress." At the twelfth hour of labor a second injection of  $\frac{1}{2}$  cc. of pituitrin was given, and again there was severe pain and no progress. The physician attempted a forceps delivery (all this in the home), but the forceps "slipped off." The patient was then admitted to the hospital almost moribund, being in extreme shock. No fetal heart sounds were heard. There was a breech presentation (recall above forceps notes), and the cervix was dilated only 4 cm. The patient died one-half hour after admission to hospital.

CASE 29: Age 37, Gravida VIII, Para V. There were 2 early miscarriages and 5 normal deliveries. This was an unrecognized extra-uterine pregnancy (probably abdominal) at the ninth month of gestation and was supposed to be uterine. The fetus was dead, macerated, and bound to the fundus posteriorly with fibrinous adhesions—this independent of rupture of the lower uterine segment. This later state of affairs followed two insertions of Voorhees bags for the induction of labor. The patient was admitted to the hospital twenty-four hours after the second or large bag had been inserted; the bags were inserted in the home and at twenty-four hour intervals. Death was from peritonitis on the third hospital day. This patient had no labor, as there was no uterine pregnancy.

CASE 30: Age 38, Gravida VI. There are no data on the type of previous full-term deliveries, but there were no sections. In this instance there was no antepartum care, and information as to the duration of labor at home was not obtainable; there was indefinite use of pituitrin according to the notes. The patient was admitted to the hospital, but there was no progress. "As a last resort (after two and one-half days in the hospital), the abdomen was opened and a dead fetus was found free in the peritoneal cavity." The patient died in twelve hours from rupture of the right side of the uterus.

CASE 31: Age 41, Gravida IX, Para VIII. There were 7 normal spontaneous deliveries and one by version—the latter three years prior to the present episode. The patient had incomplete rupture of the uterus after ninety-six hours of labor with delivery by version and manual extraction, from which pelvic infection developed. The patient was warned repeatedly about future care, but in this pregnancy failed to report that labor had begun until after seven hours. A Porro operation had been planned for one week before term, but the patient and her family did not heed the doctor's advice; labor began eleven days before the expected date. A laparotomy was done one hour after admission to the hospital. The scar of the previous rupture was intact, extending obliquely across the posterior wall of the uterus. The parietal peritoneum and mesentery were abnormally injected. (No hysterectomy was done.) Overwhelming peritonitis developed and the patient died on the fourth postoperative day.

CASE 32: Age 38, Gravida IX, Para VIII. There are no data on previous deliveries other than that three were by forceps; all eight children are living. There was no antepartum care in the present pregnancy. After eight hours of labor at home, when forceps were ap-



plied to the partially engaged head and traction was used for one and one-half hours, the patient was sent to the hospital, treated for shock, and five hours later section and hysterectomy were performed after finding "the fetus floating in the abdominal cavity and the uterus ruptured transversely in the lower uterine segment." Death from peritonitis occurred on the sixth postoperative day.

CASE 33: Age 40, Gravida VI, Para V. All previous deliveries were spontaneous. This was a case of brow presentation at term. Indefinite labor had existed for forty-eight hours before the following procedures took place: "full dilatation and Bandl's ring; ring persisted and version was performed, but manual extraction was impossible due to impacted head along with extremities protruding through the cervix; forceps were applied to the head, with no progress; then craniotomy was done and the baby forcibly extracted." This patient died one and one-half hours later.

What! oh what! can be your reaction to some of these case histories of maternal deaths which left from five to twelve children at home? There were two patients (Nos. 26 and 31) whose deaths must definitely be charged up against the patient's (or family's) ignorance and failure to listen to good obstetrical advice, both of whom had had a previous section and one a previous (healed) uterine rupture followed by pelvic infection.

No obstetrical problem is more trying than that of a transverse position with impacted shoulder and a prolapsed extremity and possibly accompanying prolapsed cord. Four cases (Nos. 21, 22, 23, and 25) of this third group (Paras V to XII) of uterine ruptures were such, but with a persistent Bandl's ring (case 21) one is simply inviting more trouble by attempting or performing a podalic version and manual extraction. Case 23 was one of transverse position and its tragic outcome must be charged to the physician's faulty judgment in that there were forty-eight hours of labor at home, as well as one injection of pituitrin early in labor and manual extraction attempted at home. Case 25, with transverse position and prolapsed cord, was allowed to be in active labor at home for forty-eight hours before being sent to the hospital.

"Version for neglected transverse presentation and attempts at turning when this procedure is definitely contraindicated are responsible for more ruptured uteri than any other operative measures excepting cesarean section."

Pituitrin must be blamed, totally or partially, for the results in several others of this third group of cases. One (case 27) was given several injections "to help her labor." This was a home case with prolapsed arm and cord. After one and one-half hours spent in an attempt to deliver her, she was referred to the hospital where she died three hours after admission. This case shows nothing but very poor obstetrics throughout and the attending physician is entirely responsible. Even in a modern delivery room, in capable, experienced hands, a version and manual extraction at times are formidable steps and such procedures are not for home deliveries.

Case 28, with a prolapsed cord, two injections of pituitrin, and attempted forceps delivery, but "forceps slipped off"—all this in the home—was finally admitted to the hospital in a moribund condition with only 4 cm. dilatation and breech presentation. This is another example of poor obstetrical judgment, faulty diagnosis, delay in seeking help, and attempting to handle a major obstetrical complication in the home.

Case 30 had been in labor an indefinite period at home with probable (according to notes) pituitrin injections, then was sent to the hospital, where after two and one-half days a cesarean section was done "as a last resort" with death occurring in twelve hours. "Last resort sections" went out at least twenty years ago, still here we encounter a case in which modern obstetrics has been entirely discarded with the to-be-expected results.

Notes on case 32 state that after eight hours of labor at home, forceps were applied to the partially engaged head and traction was used for one-half hour. This is another instance of failure to follow indications for applying forceps in addition to attempting to perform a difficult obstetrical operation in a home.

With modern hospitals available, who would attempt even a simple appendectomy in a home? Why should the profession persist in thinking that a major obstetrical operation is any less hazardous than an abdominal operation?

Case 24 had a classical section performed sixteen years prior to present labor, but she also had six spontaneous deliveries, which strongly emphasizes the now proven fact that repeat pregnancies after a section, even with spontaneous deliveries, do definitely weaken a uterus which has a section scar in it. Fear of rupture must always be present, be it the patient's first pregnancy or more after a previous section. To place confidence in a uterus after one or more spontaneous deliveries post-section is only inviting a possible catastrophe.

Case 20, which presented a simple footling and in which the delivery was difficult and carried out in a hospital, shows clearly that such operative obstetrical procedures can be disastrous even under the most favorable conditions.

Case 29 is one of mistaken diagnosis of "an extra-uterine pregnancy of between eight and nine months" in which not only once but twice was a Voorhees bag (first a small one, later a larger one) inserted in the cervix in the home. Again, what fortitude one must have to do such procedures. Death occurred on the third hospital day from peritonitis. Certainly this is a glaring example of faulty diagnosis and poor obstetrical judgment. This patient never did go into labor; she couldn't, because there was no uterine gestation. She died of a ruptured uterus from unnecessary procedures when the uterus itself did not hold the products of conception.

Please read the report of case 33, digest it, and make your own individual analysis.

#### SUMMARY AND CONCLUSION

1. There has been presented a series of 33 maternal deaths—all attributed to rupture of the uterus.

2. There were 8 primigravidas, 11 Para I, II, or III, and 14 multiparas (from 5 to 12).

3. There were 9 maternal deaths in the age group of 19 through 25 years; there were 6 deaths in the age group of 27 through 30; there were 3 deaths in the age group of 30 through 35, and there were 15 maternal deaths in the age group of 37 through 45, which latter group comprises slightly over 45 per cent of the whole series, and 13 of this age group (37 through 45) were multiparas. Age and parity

certainly are factors for consideration in the full appraisal of obstetric management.

4. Major obstetrical procedures should not be attempted in any place other than in a hospital. Early hospitalization and helpful obstetrical consultation will reduce the incidence of maternal deaths from uterine rupture.

5. With a history of cesarean section, any subsequent pregnancy or labor immediately throws the burden of responsibility on the attending physician's shoulders and he alone must determine the safe method of delivery. It is he who must decide, either alone or preferably with professional advice from a qualified colleague who is obstetrically trained and who has an obstetric conscience.

6. Transverse presentation, with or without a prolapsed extremity, is a major obstetrical condition and attempts at or performance of version are responsible for many ruptured uteri.

7. Pituitrin has a very definite place in our armamentarium, but it has no place early in labor or at any time simply because no progress is being made. It alone is responsible for many uterine ruptures even though since 1910 its dangers have been shouted from the speakers' platforms and much paper and ink have focused warnings on its use.

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# Gynecology

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## ENDOCRINOLOGY

### THE INFLUENCE OF SEMEN ON THE FEMALE REPRODUCTIVE ORGANS

V. B. GREEN-ARMYTAGE, F. SILBERSTEIN AND G. E. WACHTEL

J. Obst. & Gynaec. Brit. Emp., 54: 324, 1947

These authors describe their experiments with fresh human semen injected into immature rats, rabbits and mice, and the reaction of the reproductive organs. The human semen was collected in sterility clinics. Twenty-four hours after the injection, autopsy of the animals was performed and the genital organs of the injected animals as well as those of the controls were examined. The age of the immature animals is not indicated. In a certain number of the injected animals striking differences were obtained in comparison with the controls. Increase of the size of the ovaries, numerous ripe or maturing follicles and sometimes luteinization were seen. The uteri of the injected animals had increased considerably in length and width. Microscopically, hyperemic and edematous mucous membranes were found in the uteri as well as changes in the glandular tubules. In some experiments, on the other hand, the ovaries were found smaller than those of the controls, containing small cysts, whereas the uteri were usually longer than their controls, but appeared narrow and threadlike.

Human semen was also injected into spayed mature animals. Striking differences between the injected animals and the controls were seen in a few cases only, but they were of the same nature as those found in the first series. If the semen was boiled before the injection into the animals, no results were obtained and no differences between the treated animals and the controls were seen. More complicated experiments were performed with semen extracts in acetone and benzene. The unprecipitated benzene extract injected into immature animals revealed again a positive result.

In another series of experiments with rabbits—and this time the age of the animals is indicated—homologous semen was injected. These results are explained in a table and were nearly the same as those in a series with human semen.

From their experiments, the authors draw the conclusions that semen injections have a follicle-stimulating effect upon the ovaries of immature animals, but sometimes a retardation of the maturation of follicles is obtained. The uterine horns usually grow after the semen injections, and in some cases glandular hyperplasia and edema of the uterine mucosa is seen. In 53 per cent, when injected with human semen, positive results were obtained, and 70 per cent positive results

if freshly collected homologous animal sperm was used. Insemination of semen into the animals was tried, but the results were inconclusive.

Green-Armytage is strongly opposed to contraceptives and he believes that contraceptives prevent the absorption of semen in the vagina. But such an absorption in his opinion is important for the natural maturation and development of the virginal reproductive organs of women. Green-Armytage and his co-workers undertook, therefore, to show in their injection experiments that semen can stimulate the reproductive organs of immature animals. They conclude, from the results of their injection experiments, that hormone or hormone-like principles exist in the human semen, and that the hormone is probably testosterone or a hormone allied to it.

(The authors are not the first who had this idea. A German gynecologist, August Meyer, tried to prove it some 25 years ago. He was ridiculed. Bacsich, Sharman and Wyburn (J. Obst. & Gynaec. Brit. Emp., August, 1945) took pains to perform just the same experiments as Green-Armytage and his associates, and demonstrated to Green-Armytage their negative results. The animals which those authors used were younger than those of Green-Armytage, i.e., they were really immature, which makes a big difference.

Green-Armytage and his associates were probably not aware of the literature which exists about the capacity of the vagina to absorb organic and inorganic principles in different solutions (Briskin, Vierteljahrssch. f. gericht. Med., vol. 25; Loeser, Zentr. f. Gynäk., 1925; etc.). This question is very important, as the capacity of absorption is not always the same.

The authors certainly were not aware of the experiments of Schroeder and Goerings (Zeitsch. f. Geb. und Gynäk., 83, 1921) about substances which stimulate the growth of infantile genitals in animals. From these latter they would have seen that fresh liver-extract, for instance, can bring about just the same stimulation of infantile genital organs. Semen and semen extracts can therefore not have a more specific action than fresh protein itself.

They believe that one or more hormones are contained in the ejaculated human semen. There is certainly no hormone in the sperm itself, only protein, and it would completely contradict our knowledge and conception of hormones to assume that the prostate secretes externally a hormone-like principle into the male urethra, whence it is transmitted into the female vagina.

The fact that parenterally injected semen can, under certain circumstances, stimulate infantile genital organs as protein may do, has nothing whatsoever to do with a hypothetical absorption of semen in the vagina. One has to admire the painstaking and obstinate efforts of Green-Armytage to defend and propagate the theory that semen is absorbed in the vagina for the stimulation of the reproductive organs and regret at the same time that he utilizes for this purpose experiments obviously subject to error and misinterpretation.—Ed.)

## ENDOCRINES IN GYNAECOLOGY

R. GREENE

Brit. M. J., 1: 311, 1947

This writer offers a comment upon Mr. Aleck Bourne's paper (Jan. 18, p. 79). He states that there was good reason for Mr. Bourne to stress the concept of varying tissue sensitivity to hormones, for it is often neglected in practice.

There are 2 statements in Mr. Bourne's paper with which Greene cannot agree. Bourne states that "primary amenorrhoea can never be cured." Although cures are rare, the writer has seen 2 recoveries among many failures. One was in a 17-year-old patient with infantile figure, no visible or palpable breast tissue, a minute uterus and only a trace of pubic hair. High dosage estrogen for some months caused breast development, pubic hair growth and increase in uterine size. Soon after, uterine bleeding occurred. Treatment was changed from continuous to cyclical and, after 6 regular periods, estrogen was stopped. The periods remained almost regular. Three years after commencement of treatment the patient married and within 4 months was pregnant.

Mr. Bourne is also too dogmatic in his remarks about androgen therapy in metropathia. Although a high proportion of patients must ultimately come to x-rays or hysterectomy, many severe cases can be kept in good health by an occasional course of methyl testosterone. Hysterectomy is far too often performed in cases of menorrhagia. No harm is done and much unhappiness is avoided by a preliminary trial of medical treatment.

(As to whether or not primary amenorrhea can be cured, the answer would have to depend, I suppose, upon what is embraced under the designation of primary amenorrhea. To take an extreme and obvious example, the amenorrhea associated with congenital absence of the uterus is certainly not curable. Nor, in my experience, is that associated with extreme hypoplasia of the uterus (*uterus rudimentarius*), when this is encountered in adult women. I mention "adult women" advisedly, because the finding of a very small uterus in a girl of 16 or 17 may indicate only a very retarded puberty, in which the finding of an infantile uterus may be expected until puberty.

It is of interest to note that the uterus of the child at birth is really larger than it will be for many years thereafter, since it has been exposed to the effects of the maternal hormones. The withdrawal of the latter explains the occasional non-menstrual hemorrhage of the newborn at about the 6th or 7th day of life. Following this hormone withdrawal, the uterus decreases somewhat in size, with practically no change thereafter until estrogenic function begins. If the latter is unduly retarded, such a small uterus may be observed in the case of a girl of even 17, such as that reported by Greene in his paper. One cannot, therefore, be certain that the estrogen therapy which this patient received was altogether responsible for the later initiation of the menarche, and the development of the secondary sex characters. Whether or not it was even helpful in this respect, it is difficult to say.

A truer test would be obtained in the treatment of primary amenorrhea in a woman of 25 or 30, and in cases of this type, as for example in cases of so-called pituitary infantilism, my experience has been that regular menstruation will never be inaugurated regardless of even high estrogen dosage. Speaking generally, estrogen therapy is rarely justified in cases of amenorrhea before the age of 17 or 18, simply because it is not rare for the menarche to

occur as late as this in girls who later lead an essentially normal menstrual life. And yet it is a common abuse that many girls are started on estrogen therapy, hypodermic or oral, at 14, 15 or 16 years of age.

This is not to say that estrogen therapy should never be used in cases of amenorrhea, either primary or secondary, even though one concedes that such therapy is only substitutional, as it is. But, as I have mentioned in previous discussions in the Survey, there is nothing disgraceful in substitutional therapy. If there were, we would have to give up insulin and thyroid therapy, both of which are substitutional. In the treatment of most cases of endocrinopathic amenorrhea, the gonadotrophic hormones would be more logical than estrogens, but every one knows that thus far no worthwhile results have been obtainable, primarily because no gonadotrophic preparations are as yet available which are of undoubted efficacy in the human.

There are few gynecologists who do not employ estrogens in such cases, with full appreciation of the fact that they are substitutional and that they have no stimulating effect upon the ovarian ovulatory mechanism. But some uteri do respond to the stimulating effect of the estrogens, as shown by the frequent occurrence of bleeding following their use, and usually only during the period of their employment. In the occasional case, however, even after the discontinuance of the estrogen, a woman may go on under her own steam, though this is far less frequent in the primary than in the secondary cases.

As to the second point at issue between Mr. Bourne and Mr. Greene, I am inclined to side with the latter in his view that testosterone or methyl testosterone can be profitably included in the extensive but anything but brilliant armamentarium available to us in the endocrine management of functional bleeding.—Ed.)

## HYPOGONADOTROPIC EUNUCHOIDISM: REPORT OF CASE WITH FAILURE TO RESPOND TO CHORIONIC GONADOTROPIC HORMONE DUE TO ANTIHORMONES

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*J. Clin. Endocrinol., 7: 130-133, 1947*

The authors describe the case of a 24-year-old man with hypogonadotropic eunuchoidism who was referred to the Ochsner Clinic because of failure to develop sexually despite gonadotrophic hormone therapy. Therapy was initiated with daily subcutaneous injections of 500 I.U. of chorionic gonadotrophic hormone from human pregnancy urine for 6 weeks. There was no clinical response. The urinary 17-ketosteroids remained at the pretreatment levels. Therapy was then changed to intramuscular injections of 25 mg. of testosterone in oil daily. There was an immediate feeling of well being, gain in weight and growth of the phallus and prostate. There was a rise in the urinary excretion of 17-ketosteroids—range from 12.0 to 19.0 mg./24 hours.

Studies for antihormones on the patient's serum were carried out, using Leatham's technique. There was definitely less response to the chorionic gona-

dotropin in the animals receiving the patient's serum. Dr. J. H. Leatham tested the patient's serum and confirmed the authors finding of measurable titers of neutralizing substances against the chorionic gonadotropic hormone from pregnancy urine.

## CULTIVATION OF ENDOMETRIUM IN VITRO—A PRELIMINARY NOTE

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Texas Rep. Biol. & Med., 5: 145-147, 1947

In the course of experiments dealing with the effect of hormones on various tissues cultivated *in vitro*, simple hanging drop preparations were made of guinea pig endometrium. The authors present a brief description of their method for *in vitro* cultivation of endometrium, which affords an opportunity for endocrinologists to undertake extensive and systematic study of changes produced in the endometrium under controlled conditions with various naturally acting hormones. Uteri were removed aseptically and the endometrium was stripped from the underlying tissues by means of forceps. Endometrial fragments were cut about one mm. square and were transferred to a watch glass containing Tyrode's solution until ready for culture. One drop of equal parts of chick embryo juice (7-day incubation) and of rabbit serum was placed on a cover slip. After transferring one endometrial fragment, the mixture was clotted with a drop of heparinized rooster plasma. Serum was derived from rabbits on the 15th day of pregnancy and from normal male control rabbits. Daily observations were made on living cultures and at 96 hours they were fixed in Helly-Zenker's, washed and stained in dilute Delafield's hematoxylin.

Results from the experiments were:

1. *No estrin treatment. Serum from male rabbit in the medium.* Very few spindle cells but generally poor outgrowth.
2. *No estrin treatment. Serum from pregnant rabbit in the medium.* Spindle fiber outgrowth. One preparation showed a suggestion of stroma reaction.
3. *Estrin treated animal. Serum from male rabbit in the medium.* Moderate outgrowth of epithelial cells. No spindle fibers present.
4. *Estrin treated animal. Serum from pregnant rabbit in the medium.* Good outgrowth of epithelial cells. Mitotic figures numerous throughout the sheet of migrating cells. 3 figures.

(Thus far experiments in the culture of endometrium *in vitro* do not appear to have yielded nearly as much information as had been hoped for concerning this tissue and its hormonal reactions. I believe that one of the difficulties of these tissue cultures has been



that while the stromal connective tissue elements grow very readily and luxuriantly, the epithelial cells do not, although I note that in some of the authors' experiments epithelial growth was observed. In so far as the reaction of the endometrium to the ovarian hormones is concerned, it is difficult to believe that the response of tissue cultures would throw any more light on the problem than the far simpler methods ordinarily employed, such as the study of endometrial responses in castrated animals. Another method is that utilized by Markee, of studying the reactions of endometrial tissue implanted in the anterior chamber of the eye, and this has thrown light not only on the hormonal responses, but even more on the vascular behavior of the endometrium.—Ed.)

## THE MENSTRUAL CYCLE

### TREATMENT OF DYSMENORRHEA

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Virginia M. Monthly, 74: 271, 1947

This writer discusses primary dysmenorrhea, the etiology of which is unknown. However, the preponderance of opinion is that the symptoms arise largely by reason of motor dysfunction. R. Torpin has shown that intrauterine pressures during the menses frequently exceeded the pressure exerted during labor. Also, the curves in dysmenorrheic patients differed from those in the non-dysmenorrheic, in amplitude and frequency of contractions. An article in the January, 1947, issue of the *American Journal of Obstetrics and Gynecology*, "The Psychosomatic Aspect of Dysmenorrhea", brings forcibly to our attention the psychic elements involved.

Cervical dilatation for cervical stenosis and the insertion of a pessary for retroversion, when these are causes of primary dysmenorrhea, are often efficacious procedures. In patients who still have pain, the writer endeavors to improve the general health by giving thyroid for those with low BMR's, iron for anemias, and vitamins when indicated, and then to employ one of the 3 following preparations: (1) Nethacetin, for 24 to 48 hours before the menses and for one or 2 days after the beginning of the menses. (2) Progesterone, 2 days before the menses and one day post-menstrually. (3) Prostigmin, one or 2 days before the menses and one day post-menstrually.

If relief is not obtained by any of the above measures, there is no objection to the use of certain analgesic drugs; however, the author believes that the greatest caution should be advised in the use of derivatives of barbituric acid, and denounces the use of opiates. When all medication fails, pre-sacral sympathectomy may be resorted to. The author's limited experience promises cure in 50 per cent of cases. There is much controversy about the worthwhileness of this procedure, and it is suggested that an open mind be kept until a fair appraisal can be made.

(The etiology of primary dysmenorrhea, as the author states, is still unknown, and it is probably not always the same. The immediate factor, according to the traditional viewpoint, is that of exaggerated and therefore painful contractions of the uterine muscle. Not all investigators have been able to demonstrate any increase in the amplitude and frequency of uterine contractions in cases of primary dysmenorrhea, so that this muscular factor cannot be considered as established, plausible and rational though the theory may be. However, the hypothesis of vascular spasm rather than increased muscle contractility seems to fit the clinical characteristics almost as well.

From a therapeutic standpoint the employment of progesterone, based largely on the

muscle theory, has been disappointing, and it has been abandoned by many gynecologists, including myself. The poor results may perhaps be further explained by the fact that there has developed a definite split in opinion as to whether progesterone really inhibits uterine contractility, as was at one time all but universally believed. From a circumstantial standpoint, it may be noted that primary dysmenorrhea is a disorder of ovulating women, in whom the uterine muscle is exposed to the action of the woman's own progesterone. The anovulatory women, who have no progesterone, do not have dysmenorrhea. This is difficult to reconcile with the muscular theory of etiology and the progesterone plan of treatment.

After an experience of more than three quarters of a century with cervical dilatation for dysmenorrhea, its value is still very doubtful, to say the least, especially as it is based upon the pretty generally discredited obstructive theory of the etiology of dysmenorrhea. While it may give at least temporary relief in some cases, it is highly probable that it constitutes only one form of psychotherapy. I do not subscribe to the view urged by some writers that dysmenorrhea is always of psychogenic origin, but I do believe that the psychic factor, whether original or acquired, can never be overlooked in the management of any case. Nor, for that matter, should the constitutional.

I am frank to say that I have become less and less enthusiastic about endocrine therapy in dysmenorrhea. In the less extreme forms, in which the dysmenorrhea is limited to a day or so, simple analgesics often suffice for the immediate attack, although constitutional management and psychotherapy are of course indicated for the long range effect. In more severe cases I often employ large doses of estrogen in the first half of the cycle, as this will usually inhibit ovulation, and render the succeeding period almost or completely painless. A one mg. tablet of diethyl-stilbestrol nightly for 12 or 14 doses, begun on the second or third day of menstruation, will ordinarily accomplish this purpose, although other estrogens in proper dosage work just as well in the minority of patients who do not tolerate stilbestrol well. This plan should be employed only at intervals of several months, as it is apt to be far less effective if used on consecutive cycles and menstrual rhythm is often disturbed. Furthermore, the inhibition of ovulation would not be desirable in the case of married women anxious for pregnancy. However, in many patients the interjection of a painless period convinces the girl that she can menstruate without pain, and a marked psychological uplift is thus given.

Presacral neurectomy may have to be resorted to in the severe and intractable cases, and it appears to be successful in over half the cases, a proportion of 60 to 70 per cent being commonly reported. However, I believe it is often done on too little provocation, when simpler non-surgical management will often make the patient at least reasonably comfortable. Nor is it always a very simple procedure if it is done thoroughly, and at times troublesome bleeding may be encountered. The operation is often indicated in patients who have pelvic pathology which may or may not explain the dysmenorrhea, and the correction or removal of which may or may not cure the dysmenorrhea, as in cases of endometriosis or sharp retroflexion. In such cases the surgeon will often be impelled to fire a double-barreled gun, combining presacral neurectomy with any other indicated procedures. In my own experience, neurectomy has been more frequently done in this secondary way than as a primary procedure.—Ed.)

FUNCTIONAL BLEEDING AT DIFFERENT AGE PERIODS;  
SIGNIFICANCE AND MANAGEMENT

EMIL NOVAK

*Baltimore, Maryland*

J. Michigan M. Soc., 46: 447-450, 1947

Functional bleeding, one of the most common gynecological disorders, is due to aberration of either the ovulatory or non-ovulatory types of cycle, the latter proportionately much more often than the former. To the anovulatory group belongs the so-called metropathia hemorrhagica of Schröder, for which a simpler and more expressive designation would seem to be anovulatory functional bleeding. In this type of bleeding, not only may ovulation fail to take place, but the unruptured follicle may persist in actively functioning form, so that the endometrium is subjected to an abnormally persistent and relatively excessive estrogen influence. Instead of a single large persistent follicle, a considerable number of smaller follicles may persist functionally. In either case the endometrium may be expected to show a purely proliferative picture, with none of the secretory characteristics which are dependent upon progesterone. There is no parallelism between these endometrial growth changes and the occurrence or amount of bleeding.

The ovarian dysfunction is clearly secondary to a more fundamental dysfunction of the anterior hypophysis. The immediate factor in the production of the bleeding phases is the occurrence of periodic drops in the level of estrogen brought about by the reverse inhibition of the FSH principle whenever the estrogen level becomes sufficiently high. Excess of estrogen inhibits the pituitary function. As long as the endometrium is under the influence of a steady and sufficient amount of estrogen, it does not bleed, but when this estrogen support is withdrawn, endometrial and presumably vascular deterioration takes place, with bleeding. While this represents a brief outline of our present concept of the most common form of functional bleeding, the dysfunction may just as well involve the spiral arteriolar apparatus, the vasomotor nerves, or the myometrium, and no satisfactory explanation is as yet available.

The writer considers the management of functional bleeding at different age periods, since the age of the patient and the importance or unimportance of conserving the menstrual and reproductive functions are so important in the selection of methods of management. It is well to remember that in a large proportion of young girls the cycles are of anovulatory type for a short time after the menarche. Functional bleeding of moderate degree is quite certain, after a time, to correct itself, usually with the inauguration of ovulation. When the bleeding is so profuse as to exsanguinate the patient, transfusion, then curettage, are usually indicated. Where the emergency is not so great, the bleeding can often be checked by large doses of estrogen. As much as 10 mg. daily of diethyl-stil-

bestrol can be given for 2 or 3 days, the doses thereafter being gradually diminished. In mild cases, progesterone may be used; at least 5 and preferably 10 mg. daily by hypodermic route are required. Testosterone propionate is, in the author's opinion, likely to give better results than progesterone. Manifestations of virilism are not likely to occur if the dosage is kept below 200 mg. or 150 mg. monthly.

Functional bleeding during the reproductive years frequently calls for diagnostic curettage to rule out such conditions as incomplete abortion, submucous myoma or adenocarcinoma. If the curettings lead to an assumption of functional bleeding, unless the latter has been very severe and of long duration, nothing further should be done, and one may wait to see how the patient will behave menstrually. Often the curettage will suffice to control the bleeding; often the bleeding will recur and one must resort to organotherapy. When the patient is within a few years of the menopause, abolition of the menstrual function by radiotherapy will often be preferable to long-continued organotherapy.

In practically all cases of bleeding in the premenopausal and menopausal years, the cause can be definitely established by a combination of careful history, thorough pelvic examination, curettage and microscopic examination. In the small group of cases in which the interpretation of the microscopic examination is in doubt, panhysterectomy is clearly indicated. However, this is true in only a very small proportion of cases of functional bleeding in the middle age group, and the proper treatment of the vast majority is the safe and effective one of abolition of ovarian function by radiotherapy. There would seem to be no justification for hysterectomy for functional bleeding *per se* if the patient is in the terminal years of the reproductive epoch. On the other hand, if there is some other indication for laparotomy, the sensible plan in most cases would be to do a hysterectomy at the same time.

## MENOPAUSAL BLEEDING

C. TYRONE

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*Ochsner Clinic*

Mississippi Doctor, 24: 216-218, 1947

In his discussion of the treatment of menopausal bleeding, the writer emphasizes that the care of patients during the menopause is purely the physician's domain. He must ascertain from a combined knowledge of the condition of the patient and that of the pathologic lesions which might exist the best plan of management to carry her through this trying time. Proper understanding of the complexities of the patient's life at this time will go a long way toward helping her to solve her problems.

The administration of hormones, especially the estrogens, has undoubtedly

done as much harm in menopausal patients as it has done good. The use of any hormone in a patient who is menstruating normally and is approaching the menopause is to be condemned. These preparations do harm by possibly altering normal menstrual function, serving as a false substitute for the alleviation of psychic fears and masking pathologic conditions.

There is no doubt about the efficacy of radiation therapy in controlling abnormal bleeding at the menopause, but its use should be highly restricted. It should be employed only in the emotionally stable woman, past 45 years of age, who has not had any obstetrical injuries or previous, extensive pelvic operations, prolapse of the uterus or suspicious lesions of the cervix but who has a normal, freely movable uterus without adnexal involvement. Patients complaining of menopausal bleeding associated with the presence of pelvic pathology should have the benefit of hysterectomy. The patient should be thoroughly acquainted with what is to be done. She should be assured that removal of the uterus will not cause a long train of symptoms, that it will not result in loss of sexual powers, and that it will not cause obesity. She should be told that by removal of the uterus she will be free of future vaginal bleeding, of the future possibility of pelvic operation and of the danger of future pelvic malignancy.

(The author very properly criticizes the injudicious employment of estrogen therapy for symptoms which really have nothing to do with the estrogen withdrawal which takes place at the menopause. It is unusual for a woman who is still menstruating normally to have vasomotor symptoms. Such a woman is getting all the estrogen she needs from her still functioning ovaries, and estrogen therapy is not only illogical and ineffective, but may be actually harmful. It is usually only when periods begin to be skipped, or after they cease altogether, that the characteristic vasomotor symptoms are likely to occur, but even then the woman needs no estrogen therapy unless they constitute a real problem.)

The mere fact that a woman is 40, or 42, and that she has become nervous, high-strung and irritable, with perhaps other such symptoms as headache, does not mean, as so many doctors tell such patients, that "the change of life" is beginning. This is a short cut to a wrong diagnosis, as the actual menopause in such a woman may not occur until many years later. The only reasonably safe criterion of the actual menopause is the occurrence of typical vasomotor symptoms, and it is these symptoms which should be the target of therapy. Without them, and even with them, the conscientious doctor will take the time and trouble, as Tyrone says, to dig into "the complexities of the patient's life," and guide her, in so far as possible, toward readjusting herself.

As to radiation therapy in the control of abnormal but benign menopausal bleeding, gynecologists will differ somewhat in their choice between this and hysterectomy. However, in the group alluded to by Tyrone, including women over 45, most of us would select radiotherapeutic induction of the menopause to hysterectomy. While in such cases either vaginal or abdominal hysterectomy is associated with minimal risks, the latter are never absent altogether. The safer procedure of radiotherapy seems more logical in women already at the menopausal age, and it is effective in practically every case if dosage is adequate. It is true that ovarian function is occasionally hard to kill, and that sometimes late supplementary treatment is necessary, but even this is not a serious disadvantage.

On the other hand, if a woman of this sort has a cystocele, rectocele or prolapse that needs attention, the sensible plan is to combine the plastic repair with a vaginal hysterectomy. Or if she has a ventral hernia, or has had a number of attacks of appendicitis, it would seem foolish not to combine a hysterectomy with the indicated operation. In other words, individualization of treatment is just as important here as in all forms of surgery, but my own experience is that radiotherapy is applicable in the great majority of women at this age

period. I emphasize this because I believe that too many hysterectomies are done in cases of this type.

The justification for hysterectomy would naturally be greater in the occasional case of very intractable functional bleeding in younger women, for example, in the late thirties, a good many years before the usual age for the menopause. Certainly no one would be criticized for deciding that in such women the uterus can be much better spared than the ovaries.—Ed.)

## MENOPAUSAL HYPERTENSION: A CRITICAL STUDY

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*Am. J. M. Sc., 213: 475-476, 1947*

From this study the authors conclude that the relationship of the menopause and hypertension is incidental, and loss of ovarian secretion is neither a primary nor a contributory cause of arterial hypertension.

A total of 200 menopausal women, 179 of whom had been surgically castrated and 21 of whom had a natural menopause, was studied. The patients' ages ranged from 20 to 59 years. Hypertension was considered present if any reading exceeded 149 mm. Hg systolic and 94 mm. diastolic. If lack of ovarian secretion were truly a cause of increased arterial pressure, many of these patients would manifest arterial hypertension.

Thirteen per cent of the entire group exhibited arterial hypertension, but 10 per cent had shown this before the menopause. The hypertension was not more severe following the menopause in any patient. Thus, only 6 of the 200 patients developed hypertension following the menopause and 5 of these were 40 years of age or older. These patients had long histories of psychoneurotic manifestations preceding the menopause.

Vasomotor instability, as exhibited by hot flashes, perspiration and tachycardia, are not necessarily associated with hypertension and their alleviation by estrogens need not affect arterial pressure.

When the syndrome was preceded by the neurotic symptoms, the menopause seemed to accentuate them. Despite severe neurotic behavior, hypertension did not develop except in the 6 subjects already mentioned.

(There is still considerable haziness and uncertainty as to the occurrence and significance of menopausal arthritis or arthralgia. As to the latter, some excellent internists, like Cecil, accept it as a real entity, definitely linked up with the endocrine changes of the menopause. Others look upon it as not differing from ordinary types of arthritis.

The same differences of opinion are to be seen as regards menopausal hypertension. Those who recognize this entity, and among these are many excellent gynecologists, emphasize that it is usually of moderate degree and of vacillating type. I myself have seen many instances of this variety, although I am frank to say that I have made no long-term study of them. The paper of Taylor and his associates would seem to cast much doubt on the causative role of the menopause in producing hypertension and it is to be hoped that others will make similar studies along this line.—Ed.)

## VULVA AND VAGINA

### ABSENCE OF VAGINA AND UTERUS

H. A. RIDLER

*Sydney*

M. J. Australia, 2: 774, 1946

The writer has now encountered at least 12 cases of congenital absence of the vagina and uterus. The patients have nearly all been young women, usually about to be married, who have consulted the author because they have never menstruated. All the patients have been externally well developed. The author's advice to such persons was not to marry, but the following case has shaken his belief that he did the right thing.

A 20-year-old woman, who was about to be married, complained that she had never menstruated. Examination revealed complete absence of vagina and uterus. Marriage was advised against. Four years later the patient returned about another matter, and said that she had married in spite of the author's advice. Examination revealed a depression where the vagina ought to have been, into which could be passed almost the entire length of the forefinger. The passage was entirely satisfactory to both husband and wife. Thus, the repeated efforts of her husband had made a vagina "far better than that made by the surgeon's knife or the instrument-maker's cold metal cones."

(I believe that most gynecologists would feel that Ridler gave bad counsel to the 12 young women who wanted to marry, but whom he advised not to do so just because they all had no vaginal canals, though otherwise entirely normal. The creation of a satisfactory artificial vagina has become a comparatively simple procedure, and the girl with absent vagina who disregarded Ridler's advice should not have had to depend on her husband's patience and perseverance to ameliorate her lot. I do not believe that repeated efforts of the husband will often make a vagina "far better than that made by the surgeon's knife or the instrument-maker's cold metal cones.")

Some years ago I saw a woman who had been married about 20 years, in spite of the fact that she had a congenital absence of the uterus and vagina. The site of the vaginal orifice was marked by a shallow depression not over 2 cm. in depth, not materially deeper after many years of married life than the shallow depression so often seen in congenital absence of the vagina, since the urogenital lowermost portion of the canal is usually not involved in the anomaly. I explained to the woman that a far more satisfactory canal could be made surgically, but after discussing the matter with her husband she reported that her husband was quite satisfied with conditions as they were, and so was she. Of such men can it be said that "man wants but little here below." See also comment on next abstract.—Ed.)



CONGENITAL ABSENCE OF THE VAGINA  
WITH A FUNCTIONING UTERUS

D. O. FERRIS AND R. SAMPER

Proc. Staff Meet., Mayo Clin., 22: 198-204, 1947

The purpose of this report is to emphasize again the possibility of constructing a new vagina without the use of skin grafts and to report what the authors think is the first case in which a new vagina has been constructed and successfully connected with a functioning uterus without resorting to abdominal exploration, the use of skin grafts or the use of skin from the labia.

The patient, an identical twin 14 years of age, had noticed, when her sister began to menstruate, the onset of severe low abdominal pains. These recurred monthly for a few days at first, but became progressively more severe and lasted longer each month until, during the month before the patient's registration at the Clinic, the pain became continuous, with anorexia, vomiting and a mass in the right lower abdomen. Physical examination revealed absence of the vagina and the presence of a distinct mass palpable on recto-abdominal examination.

Under anesthesia, the patient was examined and the mass presenting in the pelvis felt like a uterus distended with fluid. Vaginal examination was then carried out through the cleavage plane between urethra and bladder anteriorly and the rectum posteriorly. Dissection was carried up halfway along the posterior bladder wall. At this point the mass presented. One part of it appeared thicker than the rest; this was presumed to be the cervix, and an incision was made into the uterine cavity. A large amount of old tarry blood was evacuated from the uterine cavity. The cavity was explored and found to be entirely regular except for a small defect where the right tube entered the uterus. A glass tube was sutured in the cervix, and one week later the glass tube was removed and a specially constructed hollow lucite vaginal mold was inserted.

The body of the mold, which was  $1\frac{1}{4}$  inches in diameter and  $2\frac{3}{4}$  inches long, was designed to maintain the conformity of the new vaginal canal. A tubular projection which passed into the cervical canal was held in position by a small flange at the distal end. The hollowness of the mold permitted cyclic endometrial discharge.

Two febrile reactions during the postoperative course subsided under treatment with sulfadiazine and penicillin. One month after operation the patient had her first normal menstrual period and was examined again following removal of the mold. The cervix and vaginal wall appeared entirely normal and a biopsy specimen taken from the vaginal wall midway between the introitus and cervix was reported to be stratified squamous epithelium. The patient was dismissed with the mold in place and was told to return every 3 months. When seen 11 months after operation, her general condition was excellent and it was felt that she had an entirely satisfactory vagina. 3 figures.

(In the overwhelming majority of cases of congenital absence of the vagina the uterus is absent also, or at least virtually so. As a matter of fact, in most cases of absence of the uterus which I have seen, the organ has been represented by a very tiny nubbin of tissue (uterus rudimentarius) in the transverse peritoneal fold which one ordinarily sees in such cases (plica transvesicalis). At times, owing to non-fusion of the undeveloped Müllerian ducts, a tiny nubbin corresponding to the split uterus is found in each side of the pelvis. In addition to muscle tissue, such rudimentary uteri may microscopically show endometrium, so that they resemble tiny adenomyomas. Only rarely is the uterus sufficiently well developed as to be responsive to the ovarian hormones when these become operative. Although I have seen a rather large number of cases with congenital absence of the vagina, I personally have not encountered any in which the anomaly was combined with the presence of a normally functioning uterus, although a fair number of such cases has been reported in the literature.—Ed.)

## TREATMENT OF TRICHOMONAS VAGINALIS VAGINITIS

W. J. REICH, HELEN L. BUTTON AND M. J. NECHTOW

*Chicago, Ill.*

*Fantus Clinics, Cook County Graduate School of Medicine and Cook County Hospital  
Surg., Gynec. and Obst., 84: 891-896, 1947*

A combined use of mild silver protein, kaolin, and beta-lactose in powder and vaginal capsule, together with search for and elimination of foci and sources of reinfection, gave a successful result against *Trichomonas vaginalis* vaginitis in 97.6 per cent of a group of 84 negro patients and 98.6 per cent of a group of 69 white patients, studied under both clinic and office conditions and with infections varying in initial severity and extent over the usually encountered range.

Each patient, after being found to be trichomonas-positive, was placed on a strict clinic-home regimen. In cases where there was a focus or foci of *Trichomonas vaginalis* infection within the internal and external genitalia, the following treatment was instituted: (a) electrofulguration of Skene's ducts; (b) electrocautery of cervical erosions (first degree); (c) electrocoagulation of cervical erosions and nabothian cysts and of the endocervix in endocervicitis including bilateral transverse lacerations allowing "pocket formation"; (d) removal of cervical polyps; and (e) electrocoagulation of eroded ectropion of either anterior or posterior cervix.

The procedure for elimination of the vaginal trichomonads consisted of drying the vaginal tract and then applying, by insufflation, from 2 to 4 grams of a powder containing 20 per cent by weight of finely pulverized argyrol, 40 per cent kaolin, and 40 per cent of beta-lactose. Insufflation was given with a Graves speculum in place; as the speculum was withdrawn, insufflation was carried backward toward the vulva.

The patient was then instructed to take a douche nightly (4 tablespoons white

vinegar to 2 quarts warm water), followed by insertion high into the vaginal tract of a No. 12 gelatin capsule containing 4 grams of argyrol, kaolin and lactose powder. In one week the patient returned for re-examination, having douched only (and no capsule) on the preceding night. The following instructions were also given for prophylaxis: (1) wipe backward with toilet paper, using separate piece for urethra; (2) wash hands after bowel movement and before insertion of vaginal wick during menstruation; (3) wash external parts with soap and water before douching; boil douche tip and run hot water through douche bag for 3 minutes before using; (4) avoid use of saliva as lubricant for intercourse; douche before and after intercourse, if still under treatment, followed by insertion of capsule.

No indication of harmful effect was found at any time, and no instance of sensitivity to type or method of treatment was noted. No argyria was seen.

The treatment schedule required, in the absence of recurrence, a total of 8 reports to the clinic; weekly during the month of treatment, at 3-week intervals during the next 2½ months, and again 3 months later. An additional insufflation was given each week during the period of treatment. Those infections with an initial classification of +++ or ++++ required a longer average treatment than those with an initial classification of + or ++, and had a greater tendency to recur. The outcome in the unsuccessfully treated patients suggested failure of precaution against reinfection rather than on the part of the therapeutic agent. 6 figures.

(Among the innumerable plans of treatment of trichomonas vaginitis, that which is based on the employment of beta-lactose has always seemed to me to be one of the most effective, although I have had no experience with the combination with silver protein and kaolin. When beta-lactose is used, the simplest plan, and the one I have long employed, is to introduce 1 or 2 drams into the vagina with a spatula, spreading it over the entire mucous membrane, and retaining it with a dry tampon. This has seemed to me to be preferable to insufflation or the use of the large capsules originally recommended by Allen and his associates. The other measures advised by the authors, such as the search for and treatment of other than urethral foci, and the use of vinegar douches, are of course not to be neglected, while in addition to and between the local treatments many of us employ vaginal suppositories of such substances as Floraquin or Devegan.—Ed.)

## CHANCROID IN WOMEN IN MANILA

DOLORES G. LAO

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AND

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Am. J. Syph., Gonorr. &amp; Ven. Dis., 31: 277-281, 1947

This paper is based on the study of 60 hospital admissions for the treatment of chancroid. The patients' ages ranged from 15 to 34 years, with 35 women between 15 and 20. Among the entire group 25 (41.6 per cent) had some complaint dating from 3 to 7 days prior to admission; 23 of these complained of a painful burning sensation during urination, and 2 noted prickling or itching. The remaining 35 lesions were asymptomatic. The few early lesions seen began as apparent breaks in the epithelium which enlarged and appeared secondarily infected. The fully developed ulcers presented irregular outlines with punched out, slightly raised edges and a base covered with purulent material which, when removed, caused minimal bleeding and left a clean looking base of granulation tissue. In 53.3 per cent of cases, longitudinal ulcers were found at the posterior fourchette. Thirty-one patients in the series had multiple ulcerations. Smears from all ulcers were characterized by the presence of pus cells containing small gram-negative pleomorphic bacilli. These were tentatively considered to be Ducrey organisms, and such smears were designated as "positive."

The various therapeutic agents employed included sulfadiazine and sulfathiazole by mouth, penicillin intramuscularly, local applications of sulfanilamide, sulfadiazine, penicillin, lactic acid douches, tincture of merthiolate, azochloramide and gentian violet. The data obtained by considering the size of the lesions and rate of healing do not indicate a highly selective effect from the use of any one of the therapeutic agents. However, the local application of sulfadiazine appeared to be most effective in causing the disappearance of bacilli from the ulcers and in promoting healing. 1 figure.

## THE UTERUS

### RECENT ADVANCES IN THE DIAGNOSIS AND TREATMENT OF CANCER OF THE CERVIX

G. H. TWOMBLY

*New York, N. Y.*

Connecticut M. J., 11: 476-481, 1947

In frequency of incidence in New York State, cancer of the cervix ranks second to cancer of the breast, but is more common than the most frequent type of cancer in the male, cancer of the skin. The incidence per 100,000 of the population is 60 for the breast, 34.3 for the cervix, and 29.2 for the skin in males.

At least 90 per cent of cases of carcinoma of the cervix can be diagnosed by the physician who is willing to feel, inspect and biopsy the cervix routinely. Of the possible 10 per cent of cases which present any diagnostic problem, that is, Stage I cancer, most will show some sort of suspicious ulceration or erosion of the cervix. By biopsy, a positive diagnosis can be made in these cases on the first examination. More important than any diagnostic method, and perhaps even more important than education of the public, is the inculcation in the mind of every general practitioner, surgeon or gynecologist of the importance of feeling and inspecting the cervix and of taking a biopsy of every suspicious lesion. In making cervical biopsies, the Schiller test is often helpful in indicating suspicious areas.

The author states that a biopsy forceps is more important in making an early diagnosis of cancer of the cervix than is a knowledge of how to take or examine vaginal smears. The vaginal smear seems to be a method which works well only in the hands of experts, and even here occasional false positives are obtained. However, vaginal smears are apt to prove of great value in diagnosing intra-epithelial carcinoma (carcinoma-in-situ) and endocervical cancer.

A study of the evolution of radiation methods used at the Memorial Hospital suggests that the most effective form of treatment consists of multiple high voltage roentgen treatments around the pelvis to the limit of skin tolerance given at a target distance of at least 70 cm., accompanied by direct roentgen therapy to the cervix and parametra given through suitable intravaginal cones, and followed by the application of radium in the cervical canal. Such methods ought to give an over-all cure rate of about 35 per cent.

At the present time, a comparison is being made in the author's clinic between the above described method of radiation therapy and radical surgery. Stage I and Stage II cases in which the disease seems to be confined to the cervix are alternately classified as in Group A and Group B. Those placed in Group B are treated by radiation therapy alone. In Group A, those patients who are consti-

tionally fit for radical surgery are first given 4 treatments with a 4-cm. intravaginal cone aimed directly at the cancer, each treatment giving 500 r (measured in air). Following this intravaginal treatment, a radical Wertheim operation is performed. By this is meant first the complete dissection of the pelvic lymph nodes. Care is taken to remove as much of the utero-sacral ligaments as possible. The operation is completed by removing the uterus and parametrial structures with a wide vaginal cuff. Treatment is completed by a course of external roentgen therapy to the pelvis when healing is complete. Thus far there has been no operative mortality, but considerable morbidity from interference with bladder function. Recent experiences with radical surgery show this method to be feasible, but they have yet to prove it superior to roentgen therapy and radium. By this recent surgical experience, it has been possible to add to the therapeutic armamentarium one more method to be used under special conditions. Four cases which had failed to respond to radiation therapy but in which the cancer was still localized apparently have been cured by radical surgery. A pregnant patient in whom radiation therapy was contraindicated was treated with a minimum of discomfort and hospitalization. A patient suffering from pyometra and radiation metritis was quickly relieved of pain and restored to health. 1 figure.

(In my opinion, one of the most important statements contained in this paper is that "a biopsy forceps is more important in making an early diagnosis of cancer of the uterus than is a knowledge of how to take or examine vaginal smears." I feel that the vaginal smear method has been a bit over-publicized, and that attention may be diverted from the tried and true method of biopsy, which has been used for 80 years, with very little criticism of its accuracy. Everyone knows that biopsy can miss a very early carcinoma in which there is perhaps no gross lesion on the cervix, but it will not, if properly done, miss the diagnosis in even very small, suspicious lesions which are still in a highly favorable stage from the standpoint of treatment. I appreciate fully that an expertly examined smear may occasionally reveal evidence of cancer when no lesion can be seen on inspection, but even then one would hesitate to subject the patient to cancer treatment without the reinforcement of biopsy findings. This comment does not mean that I do not consider highly laudable the vaginal cytology studies which are being made in many clinics, and which may later yield even more valuable results than they already have. Thus far, the opinion of the best informed and most expert workers in the field is that the chief promise of the vaginal smear is as a screening method in the examination of ostensibly normal women, and that it is not to be pitted against biopsy as a method of decisive diagnosis. If one encounters a suspicious lesion of the cervix, it is biopsy and not a vaginal smear which is the important procedure, though there is certainly no reason why one should not study vaginal smears also, if he likes. In such cases, properly performed biopsy, repeated in a few weeks if necessary, will not miss many cancers.

So much enthusiasm has been shown for vaginal smear study that these comments may seem reactionary. However, I know, from personal observation, that some gynecologists are using vaginal smears who are not fully qualified to interpret such smears, and some appear to attribute more decisiveness to them than do those much more highly trained. In the present state of our knowledge, I believe it is far more important to keep drumming into the heads of both general practitioners and specialists the importance of meticulous inspection of the cervix, with biopsy of all lesions in any way suspicious, than to try to educate them in the refinements of vaginal cytology.—Ed.)

## CARCINOMA OF THE CERVIX

W. P. GIVEN

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Am. J. Obst. &amp; Gynec., 53: 947-956, 1947

The writer presents a statistical analysis of 212 cases of cancer of the cervix and cervical stump, microscopically diagnosed as such, which were handled from 1933 through 1944. Of these, 115 patients have been studied for at least 5 years. The ages ranged from 24 to 83 years of age, the majority of the patients being between 30 and 60 years of age. Eighty-six and five-tenths per cent of the patients had borne children. About 74 per cent of the group had symptoms for 6 months or less, 38 per cent for 3 months or less, and 10 per cent had no symptoms.

A definite pathologic diagnosis of adenocarcinoma of the cervix was made in 17 cases (7.9 per cent). There were 8 true cases of cancer of the cervical stump (3.8 per cent). In the author's series there was no apparent correlation between histologic classification and survival rate. Of far greater significance is the clinical classification. As is borne out in this study, the prognosis depends in most cases on the stage of the disease when the patient is first seen. If the malignancy has not spread beyond the cervix (Stage I), the chances for salvage are good. In the 115 cases treated from 1933 to 1940, on whom a 5-year salvage rate can be reported, about 25 per cent of the cases were in Stage I, 41 per cent in Stage II, 24 per cent in Stage III, and 10 per cent in Stage IV. Thus, in this group, 66 per cent, or  $\frac{2}{3}$  of the cases, were in Stages I and II. Similarly, in the cases treated from 1940 through 1944, 63 per cent, or approximately  $\frac{2}{3}$ , were in Stages I and II.

Of the 212 patients in the series, 169 (about 80 per cent) were treated with x-ray and radium. Because the x-ray is utilized to combat the parametrial infiltration which will eventually cause the patient's death if unchecked, it was given first in most instances. In most cases the radium was given one month after the last x-ray treatment. In this way, maximum shrinkage of the tumor is allowed to occur, and patients seem to tolerate the radium better with fewer side effects. Twenty-four patients received x-ray alone; for the most part this group represented advanced cases. Two Wertheim operations were performed, one being followed by x-ray. Panhysterectomy and bilateral salpingo-oophorectomy followed by x-ray were performed on 5 patients, and radium followed by panhysterectomy in one instance. All of these 6 surgically treated patients had adenocarcinoma of the cervix. The remaining cases were treated as follows: radium alone, 2; amputation, 2; amputation and x-ray, 3. Four cases were not treated because the disease was too far advanced. All but 17 patients were treated with some combination of x-ray and radium, or x-ray alone, or radium alone.

It has been possible to follow to date 206, or approximately 97 per cent, of the 212 patients in this series. Forty-nine patients, or 42.5 per cent, survived for at least 5 years. Of these 49 patients, 44 were classified as Stages I or II when

first seen; specifically, 23 were Stage I and 21 Stage II. Of this group of 115 patients, 51, or 44.3 per cent, survived 4 years, and 59, or 51.4 per cent, at least 3 years. There were 76 of these 115 patients who were originally classified as Stage I or II, and of these 44, or 58 per cent, survived at least 5 years and represent 90 per cent of the patients who survived for the 5-year period. These figures indicate that a patient classified as having Stage I or Stage II cancer of the cervix had almost a 60 per cent chance of living 5 years, whereas a classification of Stage III or Stage IV carries a hopeless prognosis beyond this period.

The 4-, 3-, 2-, and one-year survival rates for the 97 patients seen from 1941 through 1944 were not appreciably different from the rates over the first period (from 1933 through 1940), despite the fact that in 1940 radiation factors and technique were altered.

There were 47 cases of late radiation reactions in the total group of 212 patients, an incidence of 22.1 per cent. There were about twice as many reactions in those patients treated before 1940 as in those treated after 1940; this reduction in radiation complications the author attributes to improved technique in radiation therapy. 2 figures.

(The results reported in this series are exceptionally good, and this is probably to be explained by the unusually large proportion of early favorable cases. Seventy-four per cent of the patients had had symptoms for 6 months or less. Fully 66 per cent were classified as in Stages 1 or 2, 25 per cent in Stage 1 and 41 per cent in Stage 2. The plan of treatment employed in almost all cases was radiotherapy, only a few being treated surgically, and this is in conformity with the trend in almost all clinics. The moral to be drawn from such a report as this, and from almost every other report which has ever been published, is that the woman who receives adequate treatment in an early stage has an excellent chance for cure, while the late case has comparatively little chance, regardless of how thorough and expert the treatment.—Ed.)

## THE ROLE OF THE GENERAL PRACTITIONER IN THE DIAGNOSIS OF PELVIC CANCER

L. C. SCHEFFEY

*Jefferson Medical College and Hospital, Philadelphia, Pa.*

Rhode Island M. J., 30: 339-343, 1947

The early diagnosis of pelvic cancer naturally depends upon a careful history, but there must be, coincidentally, an evaluation of the symptoms. Linked with this is a knowledge of previous general and local treatment, because long-standing therapy for any condition has a distinct bearing on the diagnosis. In recent years there has been the long and continued use, indiscriminately advised and employed, of endocrine therapy. This has a place, when properly employed, but it is a two-edged sword. The writer does not mean that giving estrogenic sub-



stances actually causes cancer, but that their use, without an internal examination, to exclude an organic cause of bleeding, creates the hazard of delayed diagnosis and proper treatment. Hence, if these points in the history are secured, with regard to previous treatment, it is of decided help in evaluating the symptoms.

There is no way in which to make an exact diagnosis of pelvic disease without an examination, and one has to think of the associated parts of the body that may be involved. Adequate means to examine the pelvis consist of a satisfactory examining table, good illumination and certain instruments that help. There are a certain number of cases in which a diagnosis cannot be made without examination because there are no symptoms.

The author discusses cancer in its most common situation in the pelvis; that is, carcinoma of the uterus. Carcinoma of the cervix is most frequent, and we know it is most commonly seen in women who have borne children, or who have had miscarriages or infection of the cervix. The author's records, and this has been borne out by other large clinics, show an amazing figure when you consider that approximately 30 per cent of cervical carcinomas occur in women 40 years of age or younger. When it is considered that nearly one-third of cervical cancer patients are women in the reproductive period of life, one realizes that there is no such thing as a "cancer age." Of course, abnormal bleeding is the main symptom noticed by the patient. With respect to carcinoma of the fundus, 4 out of 5 cases occur in women who have stopped menstruating. There is a "dangerous decade," from 40 to 50 years of age, when bleeding from inside the uterus may be thought to be due to fibroids, because they are easily felt, and it is at this time that the writer thinks most of the failures and mistakes in the early and proper diagnosis of cancer of the body of the uterus are made. The author speaks primarily of biopsy and curettage as diagnostic methods because he thinks they are still the safest and surest ways of diagnosing carcinoma of the uterus.

A study has been made of the Papanicolaou smear technic in the diagnosis of uterine cancer. To date, 418 cases have been studied by the cytologist and pathologist, without either knowing of the other's findings. There were 59 patients with cancer of the uterus; of these there were 41 correct diagnoses, as proved pathologically, or 70 per cent. The percentage of error, or false negatives, was 28 per cent. Of the patients who did not have cancer—359—there were 4 false positives, a trifle over 1 per cent. The writer thinks that the vaginal smear offers us a great deal in periodic examination where we are studying women with no definite symptoms or signs of carcinoma of the uterus. He would not be willing to advise and plan irradiation or surgical treatment except by confirmation through biopsy and/or curettage.

## ENDOMETRIAL SARCOMA?

P. A. YOUNGE, F. M. INGERSOLL, J. V. MEIGS, S. WYMAN AND T. B. MALLORY

New England J. Med., 236: 835-839, 1947

The patient whose case is presented in this report was first admitted to the hospital because of vaginal bleeding, abdominal cramps and the passage of clots. These symptoms had begun 3 months previously and for 6 days before entry she had bled constantly. The patient was 42 years old. Examination revealed a slight cystocele and first-degree procidentia. There was a bloody discharge from the cervix and the uterus was twice its normal size. Total hysterectomy was performed. The pathological diagnosis was neurofibromas of the myometrium. The patient recovered.

Two years later the patient was admitted with complaints of weakness and slight stress incontinence. An anterior colporrhaphy and perineorrhaphy were performed.

Fourteen months later the patient was admitted for the third time. She continued to suffer from weakness and fatigue and for 10 months she had had occasional attacks of nausea and cramps in the "pit of the stomach." She also complained of increasing constipation and weight loss of 10 pounds, despite progressive abdominal enlargement. Examination revealed a large, poorly defined, somewhat movable, hard, slightly tender mass filling most of the right lower and middle portions of the abdomen. A smaller cystic mass was felt in the left pelvis, and there was a mass dissecting down between the vagina and rectum. At operation the lower half of the abdomen was studded with a polypoid type of tumor that had infiltrated the omentum and was adherent to the abdominal wall. In the pelvis there were other masses of a similar type of tumor. The omentum was resected, but the surgeon was unable to remove the tumor in the pelvis. The ovaries were not removed.

Dr. Mallory states that the tumor corresponds entirely in its histologic appearance to a group of lesions that were reported some years ago by Frank (*Am. J. Cancer*, 16: 1326, 1932) under the title of "endolymphatic fibromyosis of the uterus." He is quite sure that it has been referred to at times as stromal endometriosis.

Dr. Meigs states that Goodall (*J. Obst. & Gynaec. Brit. Emp.*, 47: 13, 1940) and later J. Miller (*Am. J. Obst. & Gynec.*, 47: 784, 1944) reported a stromal endometrium having all the characteristics seen in a case studied some years ago by Meigs.

The present patient received a total of 4100 r during a 3-week period post-operatively. When seen 4 months later she looked well and all the masses had disappeared except the one in the rectovaginal septum. Dr. Meigs states that Goodall and Miller wrote that x-ray treatment, not of the tumor but of the gonads, may perform the miracle that seems to have been performed. 2 figures.

(The most recent review of the subject of "endolymphatic stromal myosis", and a very good one, is that by Dr. Nelson Henderson, in the *American Journal of Obstetrics and Gynecology*, 52: 1000, 1946.—Ed.)

EXAMINATION OF THE URINARY AND LOWER  
INTESTINAL TRACTS BEFORE TREATMENT OF  
CARCINOMA OF THE CERVIX UTERI

L. A. POMEROY

*Cleveland, Ohio*

Am. J. Roentgenol., 57: 453-454, 1947

The author reports 271 cases of carcinoma of the cervix in which intravenous pyelographic examination was made before the treatment of these patients. Definite abnormality of one or both kidneys was found in 16.2 per cent. The incidence of kidney involvement suggests that this method should be used in examining all patients with carcinoma of the cervix uteri. There appears to be no connection between the number of pregnancies and the abnormal pyelographic findings reported.

In addition, many of the patients were studied by cystoscopy, proctoscopy and barium enemas. These examinations revealed less frequent involvement of the bladder and rectum than of kidneys. Such examinations should be included in any thorough pretreatment studies of these patients.

(The preliminary examination of the urinary and lower intestinal tracts, as advocated by the author, is especially important in the more advanced cases, in practically all of which radiotherapy is contemplated. In these, cystoscopy and digital examination of the rectum, with sometimes proctoscopy, often throw revealing light on the advancement of the disease and may greatly influence the plan of radiotherapy. Simple digital examination of the rectum should be part of the examination of every case, and it often gives much more information about such things as parametrial and broad ligament involvement than can be obtained from vaginal examination alone.—Ed.)

## CHLOROMA OF THE UTERUS

E. GUEISSAZ (NEUCHÂTEL)

Schweiz. med. Wschr., 77: 245, 1947

The author reports a case of lymphatic leucemia, first recognized by marked infiltrations of the genital organs, and in which these organs appeared exclusively affected. Lymphatic leucemia is accompanied by tumoral infiltrations which are not rare in the skin, breast, orbit and lacrymal glands; it is the uterine localization which is exceptional.

In the present case, genital infiltration began in the uterine corpus, producing clinical metrorrhagia and histologically, a very marked infiltration of the myometrium; the muscular fibers were completely dissociated. This infiltration produced an actual macroscopic uterine tumor, the uterus being enlarged to the size

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## THE ADNEXA

### OVARIAN CHANGES WITH AGING

R. L. HERDENER

J. Geront., 2: 78-80, 1947

This writer attempts to correlate significant observations from previous reports on ovarian changes with those recently made by Earl T. Engle (Cancer Research, 6: 578, 1946) on the ovaries of aged rats. All of these observations are waiting to be linked into the picture that some day will explain the relation between masculinizing ovarian tumors and their histogenesis.

The currently accepted histogenesis of Brenner tumors, some pseudomucinous cystadenomas and the tubular form of arrhenoblastomas is that they arise from various fetal rests of the ovaries and their appendages. Recently they have been identified with a specific cell. The morphology of the grooved nucleus of this cell, which appears in varying proportions in masculinizing ovarian tumors, has been the subject of some studies. D. N. Danforth demonstrated the resemblance of the nuclear detail of some cells of Brenner tumors and pseudomucinous cystadenomas to this cell with the grooved nucleus. A. C. Ivy stated that the grooved nucleus cells bore a resemblance to the cells of Sertoli in the seminiferous tubules of the adult testis and speculated on the possible relation of the grooved nucleus cell to the Sertoli cell.

The presence of a basic grooved nucleus cell in many pseudomucinous cystadenomas is of further interest because a small proportion of these tumors may be derived from Brenner tumor cell rests. L. B. Arey reported on the possible significance of the presence of this nuclear deformity in Brenner tumors, Walthard cell rests, and elsewhere.

J. C. Furth and J. S. Butterworth reported that, as Brambell, Parkes, and Fielding, they too had found in the ovaries of irradiated mice, anomalous structures resembling epithelial tubes growing down into the stroma from the germinal epithelium of the ovaries. These tubular adenomas, as they called them, were found only in irradiated mice.

More recently, E. T. Engle has reported tubular adenomas and testis-like tubules in the ovaries of aged rats. The cells lining these tubules bore a pronounced resemblance to the Sertoli cells. The tubules which Furth and Butterworth reported they did not find in unirradiated mice were found by Engle in the normal ovaries of some of the aged rats. These tubules were characterized by lining epithelial cells of vague cytoplasmic borders, and nuclear characteristics of the Sertoli cells. The common feature characterizing the component cells of all tubules was the indistinct cytoplasmic border, as observed in testes where all the spermatogenic cells are absent. Two of the rats with the tubular adenomas also

of a fist. In addition, the uterus contained a fibroma. As in other reported cases, the endometrium participated very little in the pathological process.

After high subtotal amputation of the uterus, regular periods were reestablished, scanty but very painful. Five months later, the vagina was found very much infiltrated. This leucemic tumor had evolved as a malignant tumor; after ablation of the corpus it had spread toward the parametria into the vesico-uterine excavation, then on the anterior abdominal wall.

The operative specimen had not the characteristic green color of a chloroma, but microscopically it was in all aspects similar to the uterine chloroma described by Poynder. In the vagina, the infiltration gave the impression of a sarcoma as in Held's case. In spite of x-ray treatment, the patient died after 10 days. Autopsy was not done.

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J. Geront., 2: 78-80, 1947

This writer attempts to correlate significant observations from previous reports on ovarian changes with those recently made by Earl T. Engle (Cancer Research, 6: 578, 1946) on the ovaries of aged rats. All of these observations are waiting to be linked into the picture that some day will explain the relation between masculinizing ovarian tumors and their histogenesis.

The currently accepted histogenesis of Brenner tumors, some pseudomucinous cystadenomas and the tubular form of arrhenoblastomas is that they arise from various fetal rests of the ovaries and their appendages. Recently they have been identified with a specific cell. The morphology of the grooved nucleus of this cell, which appears in varying proportions in masculinizing ovarian tumors, has been the subject of some studies. D. N. Danforth demonstrated the resemblance of the nuclear detail of some cells of Brenner tumors and pseudomucinous cystadenomas to this cell with the grooved nucleus. A. C. Ivy stated that the grooved nucleus cells bore a resemblance to the cells of Sertoli in the seminiferous tubules of the adult testis and speculated on the possible relation of the grooved nucleus cell to the Sertoli cell.

The presence of a basic grooved nucleus cell in many pseudomucinous cystadenomas is of further interest because a small proportion of these tumors may be derived from Brenner tumor cell rests. L. B. Arey reported on the possible significance of the presence of this nuclear deformity in Brenner tumors, Walthard cell rests, and elsewhere.

J. C. Furth and J. S. Butterworth reported that, as Brambell, Parkes, and Fielding, they too had found in the ovaries of irradiated mice, anomalous structures resembling epithelial tubes growing down into the stroma from the germinal epithelium of the ovaries. These tubular adenomas, as they called them, were found only in irradiated mice.

More recently, E. T. Engle has reported tubular adenomas and testis-like tubules in the ovaries of aged rats. The cells lining these tubules bore a pronounced resemblance to the Sertoli cells. The tubules which Furth and Butterworth reported they did not find in unirradiated mice were found by Engle in the normal ovaries of some of the aged rats. These tubules were characterized by lining epithelial cells of vague cytoplasmic borders, and nuclear characteristics of the Sertoli cells. The common feature characterizing the component cells of all tubules was the indistinct cytoplasmic border, as observed in testes where all the spermatogenic cells are absent. Two of the rats with the tubular adenomas also

had other tumors, carcinoma of the uterine cornua and adenomas of the mammary glands.

Considering the embryologic development of the chorda testis and the ovaries from the gonadal primordia, Engle suggested that some significance may be attached to the presence in the adult ovarian hilus of tubules characteristic of those in the testis.

The author considers it probable that, as Robert Meyer suggested for the arrhenoblastomas and other dysgerminomas, the testis-like tubules of the ovaries of aged rats may arise from persisting embryonic rests. However, in these cases, the restriction of the tubular formations in ovaries of rats of the oldest age groups possibly indicates a type of android proliferation which was permitted only after removal of the gynecoid influences.

(While I have frequently noted the longitudinal grooving of the epithelial cells in Brenner tumors, as described by both Danforth (Am. J. Obst. & Gynec., 43: 984, 1942) and Arey (Am. J. Obst. & Gynec., 45: 614, 1943), I have not noted it in pseudomucinous cystadenomas, although this may be due to the fact that I have not looked for it very intensively. As regards Brenner tumors, this cell grooving has seemed to support the generally accepted view of their origin from the Walthard cell islets, since a similar grooving is likewise seen in the latter.

The studies by Furth, Butterworth, Traut and others of the production by the radiation of animal ovaries of tumors resembling granulosa cell or thecomatous neoplasms have excited much interest, and some have even suggested the possibility that such tumors in women might have been incited by previous radiation therapy. This is quite surely incorrect, as the vast majority of patients with such tumors have had no previous radiotherapy. Whether the tubular structure described by the author in the ovaries of aged rats has any significance in connection with the origin of arrhenoblastoma must be considered very speculative. Incidentally, it may be noted that this tumor characteristically develops in very young individuals.

On the other hand, it is not illogical to look for some morphologic change in ovaries which no longer produce estrogen but which are still subject to the android hormones which are still operative, and which have their presumable source in the adrenal cortex. There are a number of clinical observations which suggest that such androgenic factors, previously submerged by the estrogens, may be released after the menopause, such as the coarsening of the features and the facial hirsutism occasionally even quite marked after cessation of estrogenic function. So far as I know, however, no one has described in the human senile ovary any morphologic elements, tubular or otherwise, which can be linked up with any such androgenic influence.—Ed.)

## KRUKENBERG TUMORS

MARJORIE E. CONRAD

*Wilmington, Del.*

Delaware State M. J., 19: 68-69, 1947

Krukenberg described this tumor as a peculiar malignant tumor of the ovary, usually bilateral, of considerable size, yet keeping the shape of the ovary. It



was myxomatous in appearance, slow-growing, often associated with ascites, and was eventually fatal by extension and/or recurrence.

The tumor is usually secondary to a primary carcinoma in the gastrointestinal tract, the gall bladder, breast or uterus being other possible primary sites.

The most usual possible methods of spread seen in the secondary carcinoma arising from a distant primary focus are by cell emboli through the lymph and blood channels and the seeding of free cells by the peritoneal fluid.

The symptoms are those associated with pelvic tumor. Ascites is frequent and is nearly always found when the tumor is bilateral. Often the uterus appears normal in size, or is slightly enlarged and has a hard, stony consistency due to permeation with microscopic metastases. The latter sign may be pathognomonic.

Operative removal of the ovarian growth is indicated. It is advocated to remove the secondary growth first, then the primary one.

(A short review of a subject which still presents certain points of dispute. I agree with the author that the spread of the cancer to the ovary from the primary site in the gastrointestinal tract is by way of the lymphatics, and not by the fanciful drifting of carcinoma cells from the usually gastric lesion down to the surface of the ovary. It is well to remember that not all metastatic ovarian growths secondary to gastro-intestinal carcinoma conform to the type originally described by Krukenberg, and that the designation of Krukenberg tumor is not justified in all cases, contrary to the tendency of many pathologists. Some such metastatic tumors are ordinary adenocarcinomas. The characteristic mucocellular microscopic features of real Krukenberg tumors (carcinoma mucocellulare) apparently depend on the fact that the original gastro-intestinal growth was of mucoid type, or that it developed a mucifying tendency when transplanted to the environment of the ovary.—Ed.)

## DYSGERMINOMA OVARIUM

M. S. MAZEL

*Edgewater Hospital, Chicago, Ill.*

*Am. J. Obst. & Gynec., 53: 1036-1041, 1947*

The author concludes that, in the light of clinical experience and pathologic studies of dysgerminoma ovarii, there is no room for doubt that this neoplasm is highly malignant. As a corollary, its surgical management logically must be as radical as that of carcinoma of the ovaries.

In a number of surgical textbooks which have appeared within the past 2 or 3 years, this subject is wholly ignored, while in others the authors are at variance regarding the nature and management of this form of ovarian neoplasm. On the other hand, Novak and Gray, in 1936, reached the conclusion that dysgerminoma is a highly malignant tumor compelling disregard of future pregnancy. These authors decided that radical operation is the indicated method of managing this type of tumor. Foderl, in 1938, reached virtually the same conclusion. Seegar,

had other tumors, carcinoma of the uterine cornua and adenomas of the mammary glands.

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MEIGS'S SYNDROME; A CASE REPORT AND A REVIEW  
OF RECENTLY PUBLISHED CASES

H. J. SIMON

*New York, N. Y.**City Hospital*

Am. J. Obst. &amp; Gynec., 53: 1042-1048, 1947

The author presents a case in which a solid ovarian tumor weighing 5,200 Gm., associated with ascites and hydrothorax, was removed from a patient in an apparently hopeless condition. The patient, aged 55 years, complained of a large mass rising from the groin and extending halfway to the knee, with a discharge from the lowest part of the mass. There had been progressive weakness, complete loss of appetite and muscular atrophy. She had had a nonproductive cough for several months. The menopause had occurred uneventfully at 47 years of age.

Examination revealed an emaciated woman weighing 108 lbs.; blood pressure, 190/110. The entire right chest was flat on percussion and there was some flatness at the left base. The abdomen was enlarged to the size of a term pregnancy and was filled with a hard smooth mass. Ascites was present. A large femoral hernia extended from the right inguinal area, and at its most dependent portion was an ulcer with constant discharge of clear yellow-tinged fluid.

On the evening before operation, 2,500 cc. of clear yellow fluid was removed from the right chest. At operation, 500 to 750 cc. of clear straw-colored fluid was noted. A large smooth tumor of the right ovary was removed. Right salpingo-oophorectomy was done and blood and intravenous fluids were administered. The specimen measured 26 by 23 by 17 cm. The pathologic diagnosis was fibroma of the ovary.

The postoperative course was uneventful, except for polyuria and overdistention of the bladder. This was concluded to be due to the fact that resorption of the pleural exudate following operation was so rapid that the patient developed an overdistended bladder. On the fifth postoperative day careful examination of the chest revealed no signs of pleural effusion. Six months after operation the patient weighed 123 pounds, the hernia had almost completely disappeared and she was in good health except for hypertension (190/100).

The author stresses the importance of giving every patient who presents the triad of pelvic tumor, ascites and hydrothorax the benefit of operative exploration, no matter how hopeless her condition. This has been emphasized by Meigs.

In 1943, Meigs and co-workers had collected 27 cases of the syndrome. Since then, 17 additional cases (including the writer's) have been reported. These are tabulated in this paper, bringing the literature up to date.

Patients with Meigs's syndrome are in all probability being overlooked. After all, 1,000 to 1,500 cc. of fluid in the chest cavity need not produce symptoms, and

in 1938, found that the mortality rate ranged between 35 and 60 per cent, depending upon the character of surgical procedure employed.

In the present paper, the case is presented of a 23-year-old white woman who was admitted to the hospital with a complaint of nocturia, diurnal polyuria, and of a rapidly growing mass in the lower left abdomen. The condition was stated to have existed within the preceding 6 weeks. Two months previously, a general physical examination had revealed nothing in respect to a mass in the abdomen. The patient was well-developed and in every respect a normal young woman. The mass, about the size of an 8 months' pregnancy, filled the entire left lower half of the abdomen. It was firm and lobulated. X-rays films showed a massive shadow in the left lower abdomen and pelvis with no calcified areas, making the diagnosis of ovarian tumor a certainty.

Laparotomy revealed a large amount of free fluid and a mass the size of an adult's head firmly embedded in the left pelvis. It was grayish in color, firm and lobulated. A similar but much smaller tumor, about the size of a hen's egg was found in the right ovary. No evidence of metastases was noted in the pelvis or elsewhere. The left ovary and tumor were removed in toto, together with the growth from the right ovary, in order to gain time for microscopic study and, if need proved, to obtain consent for more radical surgery. The patient recovered. Microscopic examination revealed dysgerminoma of the ovaries.

Consent was then obtained for a radical operation, and a second operation was performed one month after the first procedure. This operation consisted of total extirpation of the uterus and remaining adnexa. The pathologic diagnosis of this specimen was: fibrosis uteri; hyperplasia of the endometrium; hyperplasia of the mucosa of the Fallopian tube; and hemorrhagic cysts of the ovary.

The patient recovered and was given an intensive course of radiation post-operatively. She also was given theelin and phenobarbital to prevent menopausal symptoms. At the end of 3 months no further treatment proved necessary, and at the date of writing she had remained in normal condition and free from any symptoms.

The writer emphasizes that, although the neoplasm attacks even the very young, once the diagnosis is made, the most pressing objective is not the conservation of potential procreative power, but the preservation of life itself. 4 figures.

(It is still difficult, in view of the relative paucity of follow-up studies of large series of cases of dysgerminoma, to speak authoritatively as to the degree of malignancy of these tumors. It is certain that, as a group, they are definitely less malignant than the common types of ovarian cancer, but, on the other hand, I agree with Mazel that they are taken much too lightly by many authors. I am afraid, however, that Mazel has misquoted Novak and Gray, who in their paper of 1936 did not conclude that dysgerminoma is so highly malignant as always to compel disregard of future pregnancy.)

My own viewpoint is that when a dysgerminoma is small and well encapsulated, unilateral removal is justified, and cure will usually result. Since practically all these patients are young, postoperative radiation would not be proper, for fear of the sterilization which it was the aim of the conservative operation to prevent. When a tumor is large, it tends to break through the capsule and infiltrate surrounding organs and tissues, and in such cases radical operation should be done, followed by radiation. It is in this group, however, that a large proportion of recurrences and metastases will occur.—Ed.)

## ENDOMETRIOSIS

I. ABELL AND I. ABELL, JR.

*Louisville, Ky.*

South. Surgeon, 13: 321-329, 1947

The authors review briefly the theories relating to the origin of ectopic endometrial tissue. The various theories all have their adherents, with the result that the question of origin remains a controversial one. The embryonal displacement of Mullerian tissue has been suggested by several authors as the origin of abberant endometrium in other locations without, however, explaining the mechanism of such distant displacements. Following proved observations that under the influence of inflammation the endothelial cells of the peritoneum may be transformed into cylindrical or cuboidal cells came the serosal theory fortified by the further observation that the connective tissue surrounding such peritoneal inclusions can undergo hyperplasia and closely resemble the stroma of the uterine mucosa. This theory of metaplasia has also been held to apply to the germinal epithelium of the ovary. In 1921 Sampson first published his implantation theory, according to which uterine or tubal epithelium may at times during menstruation escape through the Fallopian tube into the peritoneal cavity and, lodging on the ovary or adjacent pelvic structures, penetrate their surfaces, with continued growth.

The authors report a case which has direct bearing on the theory of implantation. The 31-year-old patient had a discharging sinus in the left ischio-rectal region, through which about half of the menstrual flow was discharged. Operation revealed that the fistulous tract extended from this opening in the skin of the ischio-rectal fossa to the uterus. A piece of catheter was encountered during the dissection, and the patient admitted that the catheter had been placed in the uterus 5 years previously. For 4 years the catheter had apparently remained in the uterine cavity without inducing symptoms other than increased bleeding. Perforation of the uterine wall then occurred, with the catheter end projecting through the opening. Endometrial implantation then followed, with eventual involvement of the entire fistulous tract. Microscopic examination of the material removed at operation showed endometriosis.

The authors state that the classical entity of endometriosis is rarely encountered. In a series of 170 consecutive proved cases, the classical symptom of acquired dysmenorrhea occurred but 24 times, of primary sterility but 28, and of characteristic pelvic pain but 31 times. Endometriosis does produce the symptoms of any other pelvic lesion. It is found in association with every form of pelvic pathology and, while innocuous alone, it may develop in company with carcinoma. In 93 of the series of 170 cases it was associated with other pelvic lesions.

In 91 of the 170 cases, both ovaries were involved; in 44 cases either one or the

a rather thorough physical examination or chest x-ray would be necessary to establish its presence. The author suggests that both ascites and hydrothorax probably appear only after the tumor has been present for some time. Thus almost all cases of Meigs's syndrome thus far reported might be classified as neglected, or unexamined, patients.

(While a considerable group of cases of this syndrome, not only with fibroma but also with other solid tumors of the ovary, have been reported, it is quite certain, as Simon says, that a good many are still being overlooked. It is easy to see, that if a patient presents herself with a large ovarian tumor and ascites, and especially if she has a hydrothorax, she might be thought to have a probably hopeless ovarian malignancy. Now that we should all be familiar with the Meigs syndrome, all such cases should, as Simon emphasizes, be given the benefit of operation.—Ed.)

## REPORT OF PRIMARY TORSION OF THE RIGHT FALLOPIAN TUBE

M. A. HOWARD

*Portland, Oregon*

*West. J. Surg., 55: 295-296, 1947*

Primary torsion of the fallopian tube, especially when the tube is normal, is a very rare condition. A case report is presented in which the diagnosis was not made preoperatively. A 54-year-old woman was admitted to the hospital 4 hours and 15 minutes after the onset of severe cramping pains in the right lower quadrant with nausea and vomiting. There was marked tenderness in the right lower quadrant and a mass was felt on vaginal examination which was not especially tender. A diagnosis of possible twisted ovarian cyst or partial small bowel obstruction was made and operation was performed. It was found that the right tube had twisted itself about 4 times, near the proximal end, the distal portion of the tube being very large and gangrenous. The left, tube, both ovaries and the uterus were normal to palpation and inspection. Right salpingectomy and oophorectomy and appendectomy were performed. The patient recovered uneventfully.

The histological diagnosis was hematosalpinx of undetermined origin.

(While rare, such torsion of the normal tube does occur, just as it may with comparatively small hydrosalpinges. It is well to know this, because it explains certain cases in which women who had had no previous operation may appear to have a congenital absence of the tube, or, more frequently, the tube and the ovary. Careful examination in such cases shows that there is usually a short stump of the tube, as after amputation close to the uterus. In these cases the tube had undoubtedly undergone complete torsion and literally twisted itself off, perhaps many years previously. Usually the ovary is involved in the torsion also. Such auto-amputated adnexa undergo complete absorption, as even large tumors may do under similar conditions. I have seen a number of cases of this sort.—Ed.)

## FEMALE UROLOGY

### VAGINAL CYSTECTOMY

V. F. MARSHALL AND M. SCHNITTMAN

*New York, N. Y.*

*Cornell University Medical College, the New York and Memorial Hospitals*

J. Urol., 57: 848-857, 1947

In 5 selected cases of vesical or urethral neoplasm, the authors have performed cystectomy solely through the vagina. The amount of tissue removed in this operation is more than in the usual cystectomy. The postoperative courses of the patients have been most satisfactory. Cases must be selected, as fibrosis from suprapubic operations or other causes can produce such adherence of the upper portions of the bladder that completion of the procedure via the vagina would be very difficult. However, in such instances a suprapubic approach can be added. In all cases uretero-intestinal anastomosis was done as a separate operation before cystectomy.

With the cervix pulled down, a transverse incision completely through the vaginal wall was made approximately 2 cm. anterior to the cervix. The cervix and bladder were separated by inserting a finger between these 2 organs. From each end of this transverse incision parallel extensions were carried laterally and outward to the external sides of the labia minora. Depending on the extent of the lesion, the clitoris was or was not included in the next incision which encircled the urethral meatus at a radius of at least 3 cm. and included at least the upper half of each labium minus as well as some of the labia majora. This was carried down to the periosteum of the pubis. The ends of this circular cut were joined to the ends of the lateral vaginal incisions. The upper portion of the mass was separated from the periosteum until the pubic arch was visualized and an incision under the arch into the space of Retzius was made. Clamps were applied to the urethra or bladder neck for traction, putting the lateral supports of the bladder on tension. These were clamped and transfixed on either side until the ureters were cut across. The peritoneum was now identified and opened, and the peritoneum was peeled off the posterior bladder wall as far as it would easily go, cutting urachal remnants when necessary. If the slightest difficulty was encountered in separating the highest portions of the bladder from the peritoneum, a finger was placed inside the peritoneum, making evident the remaining tissues to be clamped and ligated. This manoeuvre also avoided the possibility of including bowel in a clamp. Following removal of the specimen, the peritoneum was closed with a continuous suture.

Chromic catgut sutures, placed in the neck of the cervix and into the periosteum and ligaments of the pubic arch, moved the uterus and cervix down to

other ovary was involved. This affinity for the ovaries and the far advanced nature of the pelvic pathology accounts in part for the surgical castration essential to a complete cure in 66 per cent of the cases.

Meticulous care in eliciting symptoms, proper correlation of them with the menstrual flow, and accurate interpretation in terms of the pelvic findings are essential to the diagnosis of endometriosis. The incidence of preoperative diagnosis will rise slowly as the profession becomes more and more "endometriosis conscious."

(The case reported by the authors is an unusual one in that the uterine or "menstrual" fistula had its exit in the ischio-rectal region. More often such fistulas empty at the abdominal scars of laparotomies performed for various pelvic lesions, such as pelvic inflammatory disease or endometriosis. If a diseased tube is amputated, especially without resection of the cornua, the tubal mucosa may become proliferative and undergo histological transformation to endometrium, as Sampson himself showed, and this endometrium may propagate itself along a fistulous tract, just as apparently occurred in the case reported by the Abells. In such cases, menstrual blood may be discharged from the sinus. While such cases are somewhat different from pelvic endometriosis as we ordinarily think of it, they do show the remarkable proliferative tendencies of endometrial tissue.—Ed.)

## ADNEXAL AND PERITONEAL ACTINOMYCOSIS

L. DANON (GENEVA)

Schweiz. med. Wschr., 77: 246, 1947

The case is reported of a patient who, in 1943, had her first acute abdominal episode. These continued, and it was thought that she had a parametritis with pyosalpinx. At puncture, streptococci and some coli were found. Treatment was by colpotomy and production of an inguinal fistula which contained the same flora.

Relapse occurred in 1944 and actinomycosis was thought of, but it was not found in the pus from puncture nor in the fistula. Sulfamides and x-ray therapy were given. In 1945 there was still no amelioration, so an exploratory laparotomy was performed. A subtotal hysterectomy was done which was extremely difficult because of numerous adhesions; the left tube could not be entirely removed for this reason. Microscopic examination showed foci typical of actinomycosis in the left tube. Sulfamide treatment and the classic treatment of Lugol were given.

A cachectic state and very great induration of the parametrium persisted. Some mycotic grains were recovered from the fistulous tract. Penicillin (2,000,000 units) was given. Following this treatment, there was disappearance of the induration of the parametrium, amelioration of the general state and gain in weight. Persistence of a slight issue from the fistulous tract was finally cured after a single injection of liquid of Villatte. The case was actually cured in 11 months.



advocated in every case of stress incontinence, for those associated with definite cystocele or rectocele should certainly be operated on from below. For acquired cases of incontinence, where vaginal operation has failed, or where no cystocele or urethrocele exists, the writer puts in a plea for the sling procedure, which he feels is based on sounder principles than any other yet devised. He has performed the operation 67 times, with records of only one relapse.

Professor Moir discusses the fascial sling operation which, in his opinion, should be strictly reserved for cases in which the simpler and safer procedure of colporrhaphy, with a tightening of the tissues below the bladder neck, has been tried and failed. Moir and his assistants have tried both the Aldridge and Studdiford techniques with success; the first operation has the merit of simplicity and is, on the whole, the one he prefers. The Aldridge operation is the easiest of the sling operations, and it also avoids a disadvantage inherent in both the Studdiford and Millin operations of a wide opening up of the space of Retzius. Certain difficulties in the technique of the Aldridge operation are discussed.

Mr. Stern thought the attitude to the treatment of stress incontinence was too symptomatic. Only a careful study of each patient and a knowledge of normal physiology and anatomy of micturition would enable one to make an accurate diagnosis before attempting a cure.

(While the great majority of cases of stress incontinence can be cured by comparatively simple urethroplastic procedures, such as that of Kennedy, there is an inevitable residue of intractable cases which call for more extensive procedures of the Goebel-Stoeckel type, or one of the improvements thereof which have been devised by Aldridge and Studdiford. The procedure advocated by Millin is likewise to be looked upon as a modification of the Goebel-Stoeckel operation. As regards that described by Williams, while one may agree as to the importance of raising the trigone area of the bladder, it is difficult to see how this would be accomplished by stitching the anterior bladder wall to the back of the pubis. —Ed.)

## EXTRAVAGINAL PLASTIC REPAIR OF THE PELVIC FLOOR FOR PROLAPSE OF THE BLADDER NECK; A NEW METHOD TO OPERATE FOR STRESS INCONTINENCE

A. INGELMAN-SUNDBERG

*Women's Clinic, Karolinska Sjukhuset, Stockholm*

Internat. Monthly Rev. Obst. & Gynec., 123: 242-254, 1947

Fifteen patients from this clinic have been operated upon according to the technic described in this paper. The longest period of observation was 15 and the shortest 2 months. Therefore, the tendency to relapse cannot as yet be determined. Fourteen patients are well, while one has improved only.

The author considers that stress incontinence is due to prolapse of the bladder,

plug the space previously filled by the bladder. One rubber drain was placed on each side of the cervix and into the retropubic space. Postoperatively, perineal flushes were given daily.

Thus, a block of tissue composing all of the bladder and urethra, plus the vestibule, the upper vaginal wall, all the subvesical tissue and most of the perivesical fat was excised. Abdominal incision was avoided. Visualization was good and bleeding vessels were ligated in course. Packing controlled minor bleeding. Six case histories are presented. 8 figures.

(It is not difficult to believe that in a limited group of cases of neoplasms involving the vesical neck or urethra, a vaginal approach might facilitate a cystectomy and make possible a much wider excision than would be possible from above. For the great majority of vesical malignancies, however, removal from above has clear advantages.—Ed.)

## DISCUSSION ON STRESS INCONTINENCE IN MICTURITION

E. WILLIAMS, T. MILLIN, J. C. MOIR AND D. M. STERN

Proc. Roy. Soc. Med., 40: 361-370, 1947

Mr. Williams discusses the anatomy and physiology of micturition. The common feature in all operations employed to alleviate stress incontinence is the raising of the trigone area of the bladder and the anchoring of it in the raised position. This writer describes a new operation devised by him and performed in 1942 which accomplishes this effect on the trigone. The abdominal wall is incised but the peritoneum is not opened. Transversalis fascia is incised and the bladder exposed and mobilized and the region of the neck freely exposed. By means of a curved needle and non-chromic catgut, the bladder wall, consisting of muscle and fascia, is sutured to the fibrous periosteum at the back of the pubis by 4 or more sutures placed in pairs on either side of the midline. The bladder is not opened and the abdominal wall is closed in the usual way. Nine cases have been thus operated upon since 1942, and the results are tabulated.

Mr. Millin describes a "sling" operation which he has now used for more than 2½ years with great satisfaction. An 18 Ch. self-retaining catheter is introduced, the bladder emptied and catheter drawn down so that the expanded head is in close proximity to the bladder neck. The vagina is then tightly packed. Transverse abdominal incision, 3 fingerbreadths above the pubis, is deepened through skin and subcutaneous tissues. The aponeurosis is now incised in the line of the skin incision, and 2 straps, each one cm. wide, are cut from the lower aponeurotic leaf. The recti are separated in the midline, and the retropubic space opened. The author's specially devised curved forceps is then passed below the urethra, and the blades are opened to permit the passage of the aponeurotic straps after being threaded through the outer borders of the recti. The straps are drawn taut and sutured to each other with nylon. This operation is not

in the posterior vaginal wall and then sewn together in front of the rectum. Any enterocele is taken care of by pushing up the peritoneum and suturing the sacro-uterine ligaments in the midline. Any proctoceles are freed and covered with the sutured levator portions. Perineal repair is done if the perineum is poor or the anal sphincter damaged. A rubber tube is placed in each ischio-rectal fossa. After redundant tissue is cut away, the mucosa is sutured. The vagina is sponged well with microcrystal sulfathiazole and an indwelling catheter is inserted.

Drains and packs are removed after 24 hours. The catheter can be taken out after one week.

Since this paper was written, 45 patients have been operated according to the method described, and all were healed primarily. As far as the author knows, no recurrences have occurred.

(It is probably rather difficult for the reader to visualize this operation without the illustrations, which we could not have easily obtained for reproduction here. The chief difference from certain other operative procedures is the utilization of the levator muscles in the manner described. Evidently this procedure, which would be applicable only when future pregnancies are precluded, has given good results. The fascial strip sling procedures from above (Goebel-Stoeckel, Aldridge, Studdiford) have some disadvantages and are not always easy, so that a satisfactory procedure from below would be welcomed. Whether or not the use of the levators is the answer I do not know.—Ed.)

## ADENOCARCINOMA OF THE FEMALE URETHRA; A REVIEW

L. M. WALKER AND J. W. HUFFMAN

*Northwestern University Medical School and Passavant Memorial Hospital*

Quart. Bull., Northwestern Univ. M. School, 21: 115-125, 1947

The authors have tabulated 27 cases of true adenocarcinoma of the female urethra and 5 cases of questionable adenocarcinoma of the female urethra collected from the world's literature. Eleven cases whose diagnosis is uncertain are discussed in detail.

It is suggested that the origin of this type of tumor is in the paraurethral ducts which are often found in the outer portion of the urethral wall some distance from the mucosa. The similarity between adenocarcinoma of the female urethra and prostatic carcinoma has been mentioned by several authors. That the paraurethral glands are homologous with the prostate has been generally accepted. It would seem probable that those neoplasms which have been called "cylindrical cell" and "mucoid" carcinomas of the female urethra are in reality malignancies which had their origin in the female prostate. Adenomas of the female urethra may undergo malignant change with the formation of adenocarcinomata. Only 2 of the 32 cases reported in this paper in which the age was

especially the bladder neck, without corresponding prolapse of other pelvic organs. Because of this, an insufficiency of the internal sphincter is created. The surgical technic presented in this paper was developed in order to remove this insufficiency.

As to indications for surgery, patients who are ill from neurogenic disturbances should not be operated upon unless the condition has become distinctly worse after a delivery or there is marked drop of the neck of the bladder. Roentgen studies during micturition have been considered conclusive. If a decidedly pathological ptosis of the bladder has been present, surgery has been recommended. Electrical recordings of the bladder function, according to Stig Karlson, has been very valuable, especially in those cases treated medically.

The surgical technic presented by the author may be summarized as follows: A triangular flap of mucosa is dissected so that the apex is near the clitoris and the base just above the vaginal inlet. A 3 to 4 mm. sleeve of mucous membrane is left around the urethral opening. At the base of the triangle, the incision is extended to the sides so that the anterior wall of the vagina can be dissected loose. The dissecting is done close to the vaginal mucosa with knife and small sponges, so that the urethra and whole bladder floor are freed. When the cervix is reached, its lowest portion is grasped through the vagina with a tenaculum. While pulling on the tenaculum, the bladder is pushed up as high as possible on the cervix. Any existing cystocele is invaginated, and the bladder is sutured to the cervix. The pubocervical ligaments are freed as well as possible and are then sutured in the midline under the floor of the bladder and to the cervix. The levatores are then freed by blunt dissection. If the levatores are so developed that they can be used for plastic repair, if there is no fear of future deliveries, and if a posterior plastic repair is not done, the levatores can be sutured anteriorly according to the levator technic used during an ordinary colpoperineorrhaphy. Usually each levator is freed to the symphysis and divided slightly back of the midpoint, thereby producing 2 anterior portions attached to the symphysis and 2 posterior parts fastened to the coccyx. If a proctocele is present or if the woman can be expected to have further children, the anterior levator portions should be sutured, slightly crossed, under the bladder neck, lifting it upward and anteriorly. The posterior levator portions are left for the time being. If the uterus has dropped, it can be suspended in the anterior levator portions. The technic should be varied according to the anatomical conditions.

If the levator muscles are poorly developed, it is better to avoid their use in the plastic repair and, instead, do an interposition of the uterus, and salpingectomy if the woman is fertile. The interposition must be complete and the bladder and pubocervical ligaments fixed to the posterior surface of the isthmus.

For support of the urethra, the bulbocavernosus is freed in its anterior portion and sewn together as in the operation devised by Martius. The ischiocavernosus may be used in the same manner. The orifice of the urethra is then sutured close to the clitoris, and after redundant portions of mucosa have been trimmed, repair is effected.

The posterior levator portions are now found through a longitudinal incision

## OPERATIVE GYNECOLOGY

### VAGINAL HYSTERECTOMY WITH RADICAL ADVANCEMENT OF THE UTEROSACRAL LIGAMENTS FOR PELVIC FLOOR HERNIOPLASTY IN CASES SHOWING THIRD DEGREE UTERINE PROLAPSE

W. H. VEENBOER AND H. P. KOOISTRA

*St. Mary's Hospital, Grand Rapids, Mich.*

Am. J. Obst. & Gynec., 53: 936-946, 1947

Third degree herniation of the pelvic viscera constitutes a disabling disease entity for which many procedures of operative repair have been devised, none of which to date has proved completely satisfactory. Third degree prolapse is commonly defined as a descent of the uterus to the extent that the cervix or corpus protrudes through the vulva, often with accompanying cystocele, urethrocele and rectocele, and sometimes enterocele. Most gynecologists agree that third degree prolapse, occurring in a woman past the menopause, may best be corrected by removing the uterus together with all grossly diseased tissue, and closing the hernial sacs with a repair of the pelvic floor.

In order to accomplish this, the writers have developed the operation described in this paper which differs as follows from other techniques advocated for the same purpose. After performing a vaginal hysterectomy in a routine manner and uniting the broad ligaments in the midline, the cystocele is corrected by incising the vaginal wall over the bladder from below upward, and the pubo-cervical fascia is dissected and sutured in the midline, following which *the uterosacral ligaments, previously dissected from the cervix and posterior fornix, are advanced and firmly attached to the arcuate pubic ligament on each side of the urethra.* Following this work the perineum is repaired as a routine procedure. This method not only supports the pelvic viscera, but also preserves the *natural function of the vagina.*

An accurate evaluation of the end results of the operation is limited by the fact that this technique has been employed for only the past 4 years. Up-to-date studies of 104 cases, ranging from 18 months to 4 years postoperatively, show only 2 failures: one recurrent cystocele and one postoperative enterocele. In no case was vaginal function unsatisfactory postoperatively. No cases of thrombophlebitis, pulmonary embolism or postoperative pneumonia were encountered. There were no deaths in this series.

The 2 most frequent postoperative complications were urinary infections and hematomas or infected hematomas. A Foley bag catheter is inserted before the patient leaves the operating room. Urinary infection has been minimized by leaving the Foley retention catheter in place for 5 to 7 days to provide constant drainage. In cases of infection, small doses of oral sulfadiazine usually effect

stated developed before the fourth decade. The average age of the group of true adenocarcinomata was 53.5 years.

The histologic picture is that of a glandular carcinoma reproducing the glandular arrangement of the source. Included in the group of true adenocarcinomata of the female urethra are several tumors which were reported as mucoid, colloid, or columnar celled carcinomas.

Analysis of the cases reveals that the commonest symptoms were a tumor or nodule of the urethra or genitalia which was usually painful and was stated to have been present for many years, burning and frequency of urination, some dysuria and occasionally hematuria. Genital bleeding and foul discharge were complaints when the tumors became necrotic, ulcerated and infected. Emaciation, weight loss and pelvic pain were all late symptoms.

The clinical diagnosis of adenocarcinoma of the female urethra is based upon finding a red mass present at the urethral meatus. The final diagnosis depends on the histological findings of the excised tissues. Differential diagnosis must be made not only from other types of malignancies, but also from urethral caruncles, adenomas, papillomas and diverticulæ, periurethral cysts and eversions of the urethral mucosa. Caruncles are polyp-like structures arising usually from the posterior edge of the meatus; they are often exquisitely tender and rarely bleed. Adenomas are painless, mobile, well-localized nodules within the meatus and are usually symptomless. Papillomas are nonulcerated, soft, localized nodules which are benign and usually painless. Eversion of the urethral mucosa is manifested by a pouting reddened meatus with protruding, congested and moderately sensitive mucosa. The cystic character of periurethral cysts and diverticulæ can usually be readily detected in contrast to the tumorous growth of carcinoma.

Prophylactically, all urethral caruncles, adenomas, papillomas and polyps should be removed and examined histologically. In earlier years, surgical excision was the treatment of choice of adenocarcinoma of the female urethra. Irradiation was used in only 6 of the 23 cases in which treatment was discussed. However, today it is usually favored because it usually preserves urinary continence and appears to be as effective as surgery. Interstitial radium to the lesion followed by bilateral dissection of the inguinal glands is advocated by von Mikulicz-Radecki and by Taussig.

(One of the authors of this paper (Huffman) has recently contributed a valuable anatomical study of the paraurethral ducts in the female, on the basis of serial sections and wax model reconstructions. The latter were probably seen by many of our readers in the scientific exhibit at the recent American Congress on Obstetrics and Gynecology in St. Louis. He showed that the ducts are very variable in number, location and in their ramifications, which are often extensive, and compared this area with the male prostate. As this paper will soon be published in the American Journal of Obstetrics and Gynecology, I shall go into no further details.

The present paper presents an excellent review of the subject of urethral adenocarcinoma, and again the authors call attention to its similarity to prostatic carcinoma. The paper includes sound advice as to both prophylaxis and treatment.—Ed.)

cases not requiring radical extirpation. Abdominal hysterectomy is inadequate because it requires a supplementary vaginal procedure for relief of cystocele and rectocele. Vaginal hysterectomy has been followed by a high incidence of enterocele and recurrent cystocele. Interposition produces anatomical distortion and makes subsequent surgery technically difficult. Both it and the Manchester operation leave the body of the uterus as a possible source of trouble in later years. Colpectomy is suitable only as a last resort.

The composite procedure is anatomically sound. A uterocervical segment of a size varying with the needs of the patient is left in its normal position to provide anchorage for the surrounding ligaments and support for the bladder. It may be coned out or the endometrium may be left intact so that some function is preserved. If further surgery is required the segment can easily be reached. The musculofascial collars surrounding the vagina, rectum and bladder are utilized for relief of cystocele and rectocele, and the perineum and pelvic floor are restored by bringing together and suturing in the midline the muscles and fascia which normally support the pelvic contents.

The author has recently analyzed his first 84 of these operations, and presents the following results: Anatomically satisfactory, 73; re-operation, 2; minor defects, 4; not re-examined, 5. Incontinence relieved, 20; improved, 3; not improved, 1; no information, 1. Symptom-free, 62; symptoms due to unrelated conditions, 7; to undetermined cause, 8; to anatomical defects, 2; no information, 5.

A step-by-step description of the operation is presented and the anatomical results are illustrated. 3 figures.

(Thus far there have been few reports on this operation since the excellent description of it by Richardson some years ago, from the Johns Hopkins Clinic, where it is still frequently employed. Austin obviously likes it, while others no doubt would prefer, according to individual indications, either vaginal hysterectomy, operations of the Manchester type, or, if the corpus uteri needs removal, a combination of vaginal plastic with abdominal supravaginal hysterectomy. Incidentally, the Spalding-Richardson operation is not always an easy one, it may take considerable time, and postoperative hemorrhage is not rare, although the final results are excellent. A better evaluation of its status will no doubt be possible in 5 or 10 years.—Ed.)

## WERTHEIM'S OPERATION; PRIMARY MORTALITY

DI PAOLA, G. AND MARTINEZ HECTOR

Bol. Soc. de obst. y ginec. de Buenos Aires, 26: 212, 1947

The authors report the results of the Wertheim radical operation in 52 carcinomas of the cervix, as follows:

Number of carcinomas: 112. Without treatment, 9; radium, 47; x-rays, 2; Wertheim operation, 52; Wertheim-Schauta, 2.

a prompt cure. Hematomas usually rupture spontaneously. If found by palpation under sterile precautions, they are opened with a blunt instrument. Improved surgical technique has today practically overcome the problems of hematoma formation and secondary hemorrhage. 6 figures.

(Vaginal hysterectomy is certainly a proper procedure in certain cases of third degree prolapse, although many, and I believe most, gynecologists will more frequently employ the Manchester-Fothergill type of operation. The particular procedure stressed by the authors in the performance of vaginal hysterectomy is that of advancing the uterosacral ligaments and suturing them to the arcuate or subpubic ligaments. I confess that the procedure does not appeal to me as a sound one, chiefly because it must certainly weaken the posterior segment of the pelvic floor by pulling the uterosacral ligaments far to the front, and thus predisposing to the pelvic enterocele which is one of the not infrequent and not very pleasant sequelae of vaginal hysterectomy.

The incidence of this complication can be greatly lessened by complete obliteration of the cul-de-sac, and for this the uterosacral ligaments are important. The best plan, I believe, is to insert a purse-string suture around the posterior peritoneal pouch, but this must include the uterosacral ligaments. The latter are thus drawn backward, and not forward, as recommended by the authors, and they thus greatly strengthen the posterior segment. After a vaginal hysterectomy, with proper reconstruction of the anterior segment of the pelvic floor, the intraabdominal pressure is deflected to the posterior segment, and if this is weak, a vaginal hernia is likely to result. At any rate, this is my own conception of the mechanism involved in the development of vaginal hernia after vaginal hysterectomy, although I have not seen the point discussed elsewhere.

If the authors' object in deflecting the uterosacral ligaments far anteriorly is to strengthen the cytocele repair, this would seem unnecessary if the infundibulo-pelvic, round and uterosacral ligaments are brought together from side to side to form a cradle for the bladder, after the so-called Mayo-Simpson technique, with of course the customary side-to-side suture of the pubocervical fascia.

Finally, no matter how thoroughly these steps are carried out, it is very important to close off the suburethral space, through which the urethra and bladder neck could otherwise easily prolapse. This is easily done by a triangular suburethral stitch embracing the combined infundibulo-pelvic ligaments and the two arcuate ligaments. It is conceivable that the transplanted uterosacral ligaments might reinforce this particular point, but it is not necessary, and the uterosacral ligaments serve a far more useful purpose posteriorly.—Ed.)

## TREATMENT OF THE UTERINE PROLAPSE SYNDROME BY THE SPALDING-RICHARDSON COMPOSITE PROCEDURE

R. C. AUSTIN

*Dayton, Ohio*

*Good Samaritan and Miami Valley Hospitals*

Ohio State M. J., 43: 490-497, 1947

Of the many operations advocated for treatment of uterine prolapse and associated herniations, the "composite" has proved the most satisfactory for



in diameter. Making traction with the sponge forceps and pressing the finger beneath the neck of the sac, 2 purse string sutures of No. 1 chromic catgut were placed around the sac. The sac was then pushed through the sutures with a hemostat and the purse string sutures pulled tight. Six years later, the repair was entirely satisfactory.

(While I am sure that many vaginal hernias can be cured by simple purse-stringing of the sac, without opening it, I personally consider it an advantage to incise the sac. This not only gives one an opportunity of exploration and of making entirely sure that the contents are fully reduced, but, much more important, it permits one to close off the sac from within, with entire obliteration of the cul-de-sac, by a purse-string suture which embraces the uterosacral ligaments.—Ed.)

Wertheim operation performed: 52 (grade I, 35; grade II, 17). Operability, 43, 2 per cent. Primary mortality, 5, 7 per cent. Mortality in the last 44 cases, 0 per cent.

Cause of death: Surgical shock, 1; anesthesia, 1; peritonitis, 1.

Morbidity: Cystitis, 15; ileus, 5; pelvic cellulitis, 4; parietal abscess, 3; ureteral fistulas, 3; shock, 2; evisceration, 1; phlebitis, 1; hemorrhage, 1; pyelitis, 1; vesical fistulas, 1.

Since 1936 spinal anesthesia has been used systematically. Drainage has been employed in all patients (Mikulicz, 6; tube, 1; gauze through vagina, 43).

The 0 per cent mortality rate in the last series is due evidently to a careful pre- and post-operative study and attention to the patients (hemograma, hematocrite, proteinemia, cloremia, etc. and blood transfusions, sueros, etc.). The newer concepts on Wertheim's operation and Bonney's modification are reported in this paper.

(An operability rate of 43.2 per cent (52 of 112 cases) is reminiscent of the old pre-radium days, when the only choice of the gynecologist was between radical operation and purely palliative therapy. The introduction and development of radium therapy, however, gave the surgeon a pretty good alternate plan aimed at cure, with results quite comparable to radical operation, and with far less hazard. The recent tendency toward radical operation in some cases has been limited to the early group, those of Stage 1 and, in some clinics, some of Stage 2, but even among the enthusiasts the proportion of cases submitted to radical operation would not exceed 20 per cent. In most clinics it is considerably less, and in many clinics radiotherapy is still used in practically every case.

The authors themselves say that the radical operative plan was used for only Stages 1 and 2, and the high operability rate which they report would seem explainable only on the assumption that they encounter a much higher proportion of these relatively favorable types than is true in American clinics.—Ed.)

## REPAIR OF POSTERIOR VAGINAL HERNIA FROM BELOW, WITHOUT OPENING THE SAC: REPORT OF A CASE

C. I. SEASE

*Richmond, Virginia*

*Virginia M. Monthly, 74: 227, 1947*

A 51-year-old patient had had a Kocher type suspension, anterior colporrhaphy and perineorrhaphy for uterine prolapse. Four years later she returned, complaining of budging in the vagina. A hernia was found through the cul-de-sac and it contained intestine. At operation, an incision was made as in repair of rectocele; this exposed a thin walled sac. The contents of the sac were easily reduced. Sponge forceps traction was made on the sac while the dissection was carried up behind the cervix, where the neck of the sac was only about an inch

intracervically and coitus performed. At a subsequent visit a 5 cc. balloon was placed intrauterine, with coitus performed. Tests were repeated at later dates, employing syntropan, 100 mg., with phenobarbital, gr.  $\frac{1}{2}$ , as a sedative given one hour prior to the tests. Results of these experiments showed that during coitus the vaginal muscles contract from 5 to 6 times per minute, with the waves from 12 to 24 mm. Hg. high. Cervical contractions are slight, from 1 to 2 mm. high, and from 10 to 20 per minute. In nervous and neurotic patients the contractions are higher and more numerous. The uterus shows no contractibility during coitus. All contractions were lessened and lowered by sedation. With antispasmodics, coitus is more enjoyable in the nervous state. Contractions of the vagina aid the female to reach an orgasm by stimulating the sympathetic nerves. Contractions lessen prior to orgasm, probably due to nervous impulse, while orgasm causes a deep contraction created by the added reserve energy formed within the muscle. Cervical contractions aid in sucking up the semen while the uterus remains quiet to avoid expelling it.

Allergic tests were made on the forearms of 144 patients for semen (not the husband's) sensitivity. Sodium hydroxide was used as a diluent; dust was used as a control. It was found that during pregnancy and in possible primary hypo-ovarianism there is no skin sensitivity to semen. Skin sensitivity in all other cases may be slight to negative with no particular significance. In 4 sterile cases tested there was a sensitivity to the husband's semen, but not to test semen, indicating possible sensitivity to husband.

In all of the patients tested above in whom no cervical pathology was noted, the os was measured before and after the test. Semen was inserted into the cervix and into the vagina. In each case both the husband's and test semen were used. It was observed that cervical edema may be caused by one specimen of semen and not by another. Vaginal itch may be caused by semen of one type and yet no edema may be produced.

The best treatment for psychogenic sterility is psychotherapy. For neurogenic sterility, treatment may be as follows:

- a. In disorders of the vasomotor and sympathetic system and asthma; phenobarbital and atropine.
- b. In pituitary-ovarian imbalance; pregnant mare serum and thyroid.
- c. In dyspareunia; psychotherapy and rest; benzocaine ointment applied intravaginally before coitus; vaginal dilators; antispasmodics one hour precoitally; in severe cases artificial insemination with husband's semen or Hirst's operation of dividing the vaginal muscles.
- d. In frigidity; psychotherapy; estrogens; and proper instruction in coitus.
- e. In cervical edemas; desensitization in semen allergy; artificial insemination in semen sensitivity; soda bicarbonate douches in vaginal burning; and ammonium chloride.

(The "psychosomatic concept" is all the fashion now in all fields of therapy. At first thought it would not seem to be widely applicable in the management of sterility, and even on second thought its chief application appears to be in relation to such coital factors as

## STERILITY

### PSYCHONEUROGENIC CAUSES OF STERILITY AND THEIR TREATMENT; WITH PRELIMINARY REMARKS ON ALLERGENIC STERILITY

J. J. ROMMER

*Newark, New Jersey*

West. J. Surg., 55: 278-287, 1947

The writer classifies psychoneurogenic sterility into 2 types: psychogenic and neurogenic. In discussing psychogenic sterility, he divides it into the following groups: (a) those caused by mental disorders, such as schizophrenics and epileptics; (b) those caused by worry, fears or anxieties; (c) environment; (d) depressions caused by general poor health; (e) psychic trauma; (f) sexual perversions; and (g) frigidity.

One type of neurogenic sterility is that caused by disorders of the vasomotor and sympathetic nerves. Keifer, investigating dysmenorrhea, found that a neurogenic factor caused stimulation of the internal os which resulted in uterine contractions, cervical spasms and pain. The author feels that it is possible that fears induced in the female cause a heavy outpouring of adrenalin which stimulates the sympathetics, resulting in a neuroglandular imbalance. It probably causes castration-like changes on the anterior pituitary by losing balance control of the chromophobic-basophilic ratio, thereby causing an increase in the number of basophiles, which are evacuated, and result in an increase in the follicle-stimulating hormone which is then thrown into the urine. It is possible that the pituicytes of the pars nervosa exude an adrenalin-like substance which then added to the above, causes contractions of the uterus and tubes, thereby adding to sterility. Also, this loss of balance between the pituitary and ovaries may cause the pituitary-gonadogenic factor to be lessened, resulting in a decreased and weakened ovulation. It may go so far as to cause a destruction of the entire character of the menstrual flow, resulting in an anovulatory menstruation.

Additional types of neurogenic sterility are: dyspareunias; drug intake, such as chronic alcoholism; neuralgias elsewhere in the body; and allergy and edema. Allergic edema may be subdivided into 3 types: (a) local anaphylaxis, due to anaphylactic antibodies set up by absorption of semen and/or sperm; (b) non-reaginic allergy or edema, due to an idiosyncrasy, probably only to one individual's semen; (c) hereditary atopy; and (d) vasomotor edema.

In order to check on the truth of the theories and findings, the author has attempted the following work upon patients. The Rubin kymograph was set up with a 15 cc. balloon affixed and placed intravaginally, after which the balloon was expanded. Vaginal contractions were measured when the libido of the wife was aroused by caresses and manipulation. A 2 cc. balloon was next placed

## MISCELLANEOUS

### GYNECOLOGICAL AND OBSTETRICAL PROBLEMS OF THE INDUSTRIAL PHYSICIAN

M. R. BURNELL

*Flint, Michigan*

*Women's Hospital and Hurley Hospital*

J. Michigan M. Soc., 46: 555-558, 1947

The industrial physician has found that the gynecological conditions most frequently brought to his attention and most commonly associated by the employee with her work are low back pain, dysmenorrhea, amenorrhea, excessive or intermenstrual bleeding, pelvic pain, the aggravation of symptoms of the menopause and pelvic relaxations (cystocele, rectocele and uterine prolapse).

In the pre-employment physical examination, a knowledge of any pathological state of the employee's pelvic organs is just as significant as chest x-ray, blood pressure readings and other standard procedures. Pelvic examination is just as basic as obtaining a history of any previous gynecologic disorders.

The experience of the industrial physician with the problem of dysmenorrhea differs radically from that of the gynecologist in the approach to a solution. First, he finds an amazing attitude of resignation to this periodic disability. Second, the discomfort has previously furnished a large percentage of young women with an excuse to stay home from school or to avoid unpleasant tasks. This attitude is carried into their factory environment. Lastly, "epidemic dysmenorrhea" has frequently been observed by the industrial physician. The transfer of one young woman to different work, when it was thought that the work she was doing aggravated her symptoms, may bring requests from other employees, claiming similar disability.

As a solution to this problem, the author recommends that wards should be provided in the industrial hospital where rest, local heat and simple medication will soon return most of them to their work. The employee should *not* be sent home. A sincere attempt should be made to correct the mental attitude of the employee. The industrial physician must decide whether the employee should be relieved of strenuous tasks, advised to seek systematic exercise, or receive instruction in the physiology of menstruation which might result in a change in mental attitude. Finally, he must always keep in mind that dysmenorrhea is but a symptom resulting from many gynecological conditions which can best be treated by the employee's own personal physician.

In cases of abnormal menstrual flow and intermenstrual bleeding, the medical departments of manufacturing institutions have an unequalled opportunity for the recognition of early gynecological disease. When it is found that there is

dyspareunia in the female and impotency in the male. Certainly in such conditions as these the importance of psychogenic factors and of psychotherapy will be admitted by everyone, but they are concerned in only a small proportion of sterility cases.

But when the author tries to apply the psychoneurogenic explanation to the hormones and to such phenomena as ovulation, he is obviously in a much more rarified atmosphere, and his explanations are, as I believe he himself feels, very speculative and unconvincing.

The exciting experiments reported in the fourth paragraph of the abstract likewise do not seem convincing, especially as female libido does not seem to have any great bearing on the matter of fertility. The abstract does not give all the details of the coital experiments, on such points as who did the caressing and manipulating, but it would be difficult to believe that coitus when reduced to the level of a laboratory experiment might not be shorn of some of its well-known natural attributes.

Whether or not semen allergy is of importance likewise appears doubtful, and a somewhat related aspect of this problem is commented on in connection with the abstract of the paper by Green-Armytage, Silberstein and Wachtel (p. 837 of this number of the Survey).

Most of the measures recommended for "neurogenic" sterility are in conformity with general practice, although I do not believe that many gynecologists consider estrogens of any value in frigidity, and not all will agree with the author as to the cervical edema said to be caused by some specimens of semen.—Ed.)

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In cases of abnormal menstrual flow and intermenstrual bleeding, the medical departments of manufacturing institutions have an unequalled opportunity for the recognition of early gynecological disease. When it is found that there is

no occupational cause for these symptoms, the insistence upon prompt medical attention has resulted in shortening the period of disability and has frequently saved the patient's life. It is the industrial physician's responsibility to see that female employees are properly protected from exposure to certain chemicals which occasionally give rise to increased menstrual flow or "spotting" between periods.

In cases of pelvic pain or low backache, pelvic examination is essential and, if definite pelvic pathology is present, it is the duty of the industrial physician to see that employees consult their family physician as to proper treatment.

With the increased employment of older parous women, the problem of pelvic relaxations and their aggravation by certain types of work must be studied. Pelvic relaxation in the female should be given equal consideration to hernia in the male employee.

The menopause, with its associated nervous and vasomotor instability and other symptoms, limits the type of work that these female employees should be allowed to do. If necessary, proper medical care should be instituted by the employee's own physician. Sympathetic understanding on the part of the industrial physician goes far in lessening lost time during this period.

In regard to pregnancy, the author summarizes recommendations by the U. S. Department of Labor and by the American Medical Association. These are:

1. The labor situation in this country does not necessitate the employment of pregnant women.
2. The employee should report her condition immediately to the industrial medical department, so that transfer to lighter work may result.
3. There should be no exposures to toxic substances considered to be extra hazardous during pregnancy.
4. Facilities for adequate prenatal care should be readily available for all employed pregnant women and they should be instructed as to the importance of such care.
5. A *minimum* of 6 weeks' leave before delivery should be granted.
6. In uncomplicated cases, a *minimum* period of 6 weeks should follow delivery before the new mother is returned to work.

It is emphasized that in all these problems, a better mutual understanding of the problems of the industrial physician and family physician would benefit both and the employee as well.

(Articles of this sort are refreshing in that they illustrate the enormous improvement which has occurred in industrial medicine, and perhaps especially in the supervision of the health of women workers. The intelligent views expressed by the author of the above paper, especially as regards the management of dysmenorrheic women, indicate a very sympathetic attitude toward such problems, far different from the complete disinterest shown by many employers in past year. Not only is the newer attitude a humanitarian one, but health programs of this sort must be sound investments for the employers.—Ed.)



THE PSYCHIATRIC ASPECTS OF GYNECOLOGY  
AND OBSTETRICS

J. H. WALL

*White Plains, New York*

North Carolina M. J., 8: 290-294, 1947

The author discusses the psychiatric factors in dysmenorrhea, frigidity and dyspareunia and in the menopausal syndrome. In eliciting histories from patients with psychiatric disorders, psychiatrists encounter many distorted ideas associated with the beginning of menstruation. Frequently such ideas are found in patients who suffer from dysmenorrhea. When organic factors have been ruled out, we should investigate the psychologic and emotional aspects of the problem. In addition to misinterpreting the phenomenon originally, such girls are apt to reject their feminine role. In a study of 50 women who were addicted to alcohol, the author found that 40 of them suffered from dysmenorrhea. The gynecologic consultant found no organic basis for the complaint. Psychologic studies did reveal that these women repudiated their femininity. If the patient with gynecologic complaints is given the opportunity to unburden, many distorted notions can be corrected and the patient can be taught a normal or average wholesome attitude about this physiologic phenomenon.

When organic factors are ruled out, the problems of frigidity and dyspareunia are usually a part of a complex neurosis which requires psychiatric treatment. The psychic representations of the generative organs, together with emotionally toned misconceptions and strivings in the development of the individual, have a structure or psychopathology more complex than the anatomy, physiology and pathology with which the gynecologist is familiar.

We are familiar with the physical changes which take place at the menopause and with the many serious physical diseases which occur during these decades. Careful physical examinations at intervals, and medical and surgical treatment if indicated, are unquestionably recommended, but we must be familiar with the psychologic aspects of this epoch to be of service to our patients. The woman feels that she is not needed by her children and family; there is a tendency to be hypochondriacal; and there are preoccupations with death. With loss of physical beauty, there are feelings of neglect and jealousy. Sometimes increased erotic drives may bewilder and embarrass the patient. The physician, as a sympathetic listener, can be of great assistance in the act of the patient's unburdening. He can then teach the woman in simple and understandable language what is going on. The successful adjustment involves a graceful changing of attitudes and the adopting of new interests in the home and community. The patient must realize that the adjusted woman after the menopause must be different from what she was before. A little guidance in this sphere of a woman's life is fully as helpful as sedative and endocrine preparations.

As regards the psychiatric factors in obstetrics, it has been said that the obstetrician should be the ideal person to practice mental hygiene. He sees the patient at an important time of her life, at the launching of a new one. The calm and poise of the mother have a far-reaching effect upon the mental health of her child and of the family group. If the psychologic structure of the women who is passing through this biologic experience becomes distorted and poorly organized, we can, by the correction or amelioration of this state, administer psychotherapy of long lasting value to the family and to society. Pregnancy, labor and the postpartum period are discussed by the author, and it is pointed out that, in spite of the fact that the prenatal care, management of labor and postpartum care of mother and baby approach perfection in many of our hospitals, the woman may at the same time be neglected as far as her personality and emotional reactions are concerned.

(Psychogenic factors undoubtedly play a part in the etiology of some cases of dysmenorrhea, and there are patients who can be literally talked out of their dysmenorrhea by the proper psychologic approach. Even in those cases, probably the majority, in which other and as yet unknown factors are fundamentally responsible for the pain, it is easy to see that a psychogenic factor can readily be superimposed upon the original one, and a pain habit complex thus engendered.

It is of interest to note that 40 out of 50 alcoholics suffered from dysmenorrhea, in view of the fact that alcohol has always been accepted as a potent anti-dysmenorrheic, though one never to be prescribed by a physician for fear of habit-formation. In the old days of unrestricted patent medicines, such nostrums as "Hayden's Viburnum" had an enormous popular vogue. As I recall it, some of these contained about 40 per cent alcohol, and were prescribed in doses of a tablespoonful every 20 minutes or so until the pain was relieved—through the medium of a mild jag.

At the menopause psychiatric problems are also encountered, though most of them are of mild degree, and amenable to management by even a mere gynecologist, if he happens to have common sense enough to realize that he is treating a woman who is going through the menopause and not the menopause *per se*.—Ed.)

## OPERATIONS TO PRODUCE STERILITY: MEDICOLEGAL IMPLICATIONS

B. SEARTEL

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*Am. Practitioner, 1: 484-488, 1947*

The author first discusses compulsory sterilization, proposing that such sterilization without statutory authority would unquestionably be a criminal battery, perhaps a mayhem. From seeing the operation of statutes providing for sterilization in certain states, we realize that there cannot be much of any excuse for compulsory sterilization of any group, except possibly the feeble-minded. There are only 2 states in the Union that have really made a serious

effort to carry out a sterilization program; those are California and Virginia. It seems to the author that compulsory sterilization has not proved to be really what we thought it would be when we were acting on the enthusiastic demands of the eugenicists.

As to voluntary sterilization, there are 3 types. First, you could sterilize persons voluntarily for eugenic reasons. Second, there is medical or therapeutic sterilization. A third type is contraceptive sterilization—sterilization at the choice of the person sterilized, for his convenience or for economic reasons. Voluntary sterilization, as to all of these, has this advantage over compulsory: it eliminates the coercive aspect. Another advantage is that you could sterilize carriers as well as those who are actually defective.

The next topic mentioned under voluntary sterilization is the social program of segregation, and the 2 things supplement one another very nicely. It seems to the author that we can easily lose sight of other possibilities, other alternative methods of dealing with some of these social problems, when we focus our attention too closely on some such method as sterilization. Segregation, it seems to the writer, can serve many of the same purposes as sterilization, and, in certain states, it is doing just that. As against sterilization, segregation has some distinct advantages. It is an old and well recognized method of dealing with all types of social problems. While it may prevent procreation, it does not have any direct preventive effect, and it is not a final sort of thing. Also, it eliminates a lot of unsavory publicity. On the other hand, sterilization has some advantages too. It is cheap and easy. You at least save the cost of keep of someone if you sterilize him but leave him out of an institution. The author believes that voluntary sterilization for persons such as are feeble-minded, making it possible for them to live a simple life which they could not live if they had the additional burden of children, is one good case for sterilization.

What is the status of voluntary sterilization apart from statute? As to eugenic sterilization, the writer thinks this depends on statute. Therapeutic sterilization is certainly lawful apart from any statute on the subject. The question is really this: is a sterilization asked for by a person for his own convenience, contraceptive sterilization; is that permissible? In this instance a lawyer can only guess what the courts will say about this type of operation. In a few states the sterilization statutes show by the phrasing that the act of sterilizing, except as authorized, is a crime. However, most of the states do not have legislation of that type.

Although several writers have expressed a hesitation about proceeding with sterilizations for fear that the crime of mayhem would cover such operations, the author cannot agree with their conclusion as to what a supreme court would probably hold. He thinks it unlikely that a voluntary sterilization, performed by a physician, on a man at his request—that is, a person who is not incompetent or insane—would ever be prosecuted. In closing, the writer states that he is not trying to pass on the question of whether the operation is desirable or not. He is simply raising the question of whether the doctor would need to be afraid of a damage action, and his judgment is that a successful action of this type is very unlikely.

SOCIAL AND PSYCHOLOGICAL FACTORS  
AFFECTING FERTILITY

## VI. THE PLANNING OF FERTILITY

P. K. WHELPTON AND C. V. KISER

Milbank Mem. Fund Quart., 25: 63-111, 1947

A large majority (nearly 90 per cent) of the 1,977 couples in this study tried to control the number of children and their spacing by means of contraception. Nearly all of those who did not make this effort were "relatively sterile", for over 98 per cent of the "relatively fecund" couples practiced contraception. About two-thirds of the couples began their attempts to plan fertility at marriage; about half of the remainder began before the end of the first puerperium.

About half of the "relatively fecund" couples who tried to prevent or postpone the first or second pregnancy were successful in their efforts; between 58 and 63 per cent were successful with respect to the third, fourth and fifth. In the interval before the first pregnancy "success" consisted in postponement rather than prevention in over three-fourths of the cases, but by the time the interval after the third pregnancy was reached prevention constituted success in nearly 90 per cent of the cases. Most of the couples who failed to prevent a pregnancy or delay it as long as desired were able to lengthen the interpregnancy intervals greatly in comparison with the noncontraceptors.

"Relatively fecund" couples can be classified as to the planning of fertility on the basis of the effectiveness of their use of contraception, and their attitudes toward each pregnancy. The categories used in this analysis are:

(a) "Number and spacing planned." These couples succeeded in preventing pregnancies altogether, or conceived only when contraception was stopped because a child was wanted.

(b) "Number planned." The last pregnancy, but not all of the preceding pregnancies, of most of these couples began when contraception was stopped to have a child.

(c) "Quasi-planned." The last pregnancy of these couples was not planned but either it or another pregnancy was wanted by both the wife and husband.

(d) "One-too-many." The average of the number of pregnancies after the last wanted by the wife and the number after the last wanted by the husband is one-half, one or one and one-half.

(e) "Two-plus-too-many." The average of the number of excess pregnancies according to the wife and according to the husband is two or more.

Approximately 28 per cent of these "relatively fecund" couples are "number and spacing planned," 14 per cent "number planned," and 31 per cent "quasi-planned." Less than 20 per cent are in the "one-too-many" group and only about 7 per cent are in the "two-plus-too-many" group. If the classification is based on live births or living children instead of pregnancies the distribution differs only slightly from the foregoing.

There is a strong relation between size of family and success in planning fertility. The average number of pregnancies per couple is lowest (1.2) in the "number and spacing planned" group, highest (5.0) in the "two-plus-too-many group," and between 2.2 and 2.8 in the three intermediate planning groups. Live births and living children vary similarly.

Opinions as to the spacing of children are quite uniform. Between 68 and 76 per cent of the couples in each group said the "most desirable" time for the first child is two to three years after marriage. Between 81 and 89 per cent said the "most desirable" time between subsequent children is two to three years. The actual spacing of children, in contrast, varied widely from group to group and from the reported "most desirable" spacing. A large majority of the couples in the "number and spacing planned" group postponed their first child more than three years, but a large majority of those in the other groups had it within two years. Subsequent intervals tended to be longer than "most desirable" among the "number and spacing planned" and "number planned" couples, and shorter than "most desirable" among the "two-plus-too-many" couples.

Nearly all of the husbands but only a little more than one-third of the wives knew of one or more methods of contraception before marriage. Nearly all of the other wives obtained similar information before the second pregnancy. The consequence, variations in time of learning about contraception were of only minor importance in determining the fertility planning status of couples, and the average size of family for the planning groups. Differences in the rapidity of putting knowledge into effect were of some importance, however. The couples in the "number and spacing planned" group began at once their attempts to space pregnancies on a "motive" or "action" basis, but 40 to 50 per cent of the couples in the other groups waited until after the first pregnancy or later.

The fertility planning groups appear to have differed only slightly in fecundity—the ability to conceive and bear a child. The differences which can be found are too small to be of account.

Variations in the ability to use contraception effectively were responsible for most of the differences in average size of family among these "relatively fecund" couples. There were no accidental conceptions to the 403 couples in the "number and spacing planned" group during the 56,613 months that they practiced contraception. But among the "two-plus-too-many" group there was one accidental first conception for every 8.7 months when contraception was practiced, and one accidental second or subsequent conception for every 29.4 months of such exposure. Because of these differences in ability to control family size and spacing by means of contraception the fertility of the "number and spacing planned" couples was reduced by nearly 85 per cent, that of the "number planned", "quasi-planned" and "one-too-many" couples by 63 to 71 percent, but that of the "two-plus-too-many" couples by less than 40 per cent. If fertility had been left to nature the number of pregnancies per couple probably would have averaged between 7.4 and 8.0 in each group. But as a result of planning there were only 1.1 pregnancies per couple in the "number and spacing planned" group, 2.2 to 2.8 in the "number planned", "quasi-planned" and "one-too-many" groups, and 5.0 in the "two-plus-too-many" group.

In spite of the foregoing reductions in fertility the couples in the last two groups had larger families than they desired. If they had been able to prevent the conceptions which occurred after the last wanted by the wife or husband they would have lowered their fertility by 75 and 73 per cent, respectively, or about as much as all the other couples. The average number of pregnancies per couple would then have been 1.9 or 2.0 for the "one-too-many" group and 2.2 for the "two-plus-too-many" group (or very slightly more than that for all other couples) and the fertility rate of all the "relatively fecund" couples would have been reduced about 17 per cent.

With less than one-fourth of the "relatively fecund" couples in such an urban group having more children than they want and nearly three-fourths having just the number they want, it is evident that the future trend of the birth rate for the entire group is going to depend in important degree on the changes which take place in the number of children wanted. It is extremely important, therefore, to try to determine which social and psychological factors influence the number of children desired, and to analyse their effectiveness. Information on these matters will form the basis for subsequent articles in this series. 3 figures.

(I suppose that if I had concentrated intensively on this rather involved paper, I might have gotten into my very unmathematical and anti-statistical mind some idea as to just what the authors are trying to prove, and thus made some sort of intelligent comment. The only one that occurs to me now is that even such a difficult and intricate subject as this could probably be made a little easier of comprehension to the average reader than it is in this paper.—Ed.)

## THE VALUE OF THE STAINED VAGINAL SMEAR IN GYNECOLOGICAL DIAGNOSIS

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*University of California Medical School*

Rocky Mountain M. J., 44: 376-380, 1947

The writer describes the application of the stained vaginal smear to the field of gynecology as a whole. Either fortunately or unfortunately, we have been led to think of the vaginal smear chiefly from the point of view of cancer diagnosis. However, the procedure can reveal many other normal and pathological processes occurring in the utero-vaginal tract. It is felt that this procedure should become part of the routine gynecological examination. The variety of information it can give should place it at the top of all laboratory-involving procedures for the gynecologist.

The characteristics of the vaginal smear in normal menstrual cycles are described. Anovulatory cycles must be discerned by following a series of smears

at weekly intervals over a month or succession of months. The first anovulatory cycle is expressed in the smear by a persistence of the various criteria of the pre-ovulatory phase—the cytoplasm of the cells remains acidophilic beyond the time for normal menstruation and the cells gradually become pyknotic as menstruation approaches. With the second anovulatory phase the cytoplasm becomes more acidophilic, more of the brown inclusion bodies may be noted and the nucleus remains small and densely basophilic. With 3 successive anovulatory cycles the vaginal smear approaches that observed in cystic glandular hyperplasia.

In cystic glandular hyperplasia or hyperestrinism, hyperkeratinization of discrete cells may be a fair summary of the findings. Patients checked by both vaginal smears and curettage biopsy have shown that the diagnosis of hyperestrin states is as clear in the vaginal smear as upon curettage.

In primary and in secondary amenorrhea the cellular response in the smear is one of degree. There are many small basophilic cells with disproportionately large nuclei. There are relatively few nucleoli. The vaginal smear is an indispensable index of treatment in amenorrhea. In addition, it will show whether or not normal ovulation is being established.

In trichomonas infections one may see the stained trichomonads and, in addition, there is a most marked degree of keratinization. This should be differentiated from that of hyperestrin states. In monilia vaginitis one sees the branched yeast forms surrounded by large basophilic epithelial cells.

The menopausal decline of pituitary and gonadal function is reflected in the smear by gradual increase in the numbers of small round or oval, increasingly basophilic cells of the atrophic type. The author's studies have shown that the decline in ovarian function in normal women begins at about the age of 35 and continues until the age of 52 or 53. The vaginal smear is a useful guide in estrin therapy at the menopause.

Carcinomatous lesions of the endometrium, endocervical and portial epithelium are characterized by exfoliative tendencies. The recognition of the characteristics of malignant cells is a matter requiring experience. Because the smear is diffuse and all-inclusive, and because it may reveal early lesions, it has an advantage over the biopsy. The smear should be backed by biopsy before radical therapeutic procedures are resorted to.

(It was Traut, in collaboration with Papanicolaou, who in 1943 published the monograph which gave the impetus to the vaginal smear method in the diagnosis of uterine cancer, which has inspired the writing of many papers on the subject, quite a number of which have been abstracted and commented upon in previous issues of the Survey. In this paper Traut considers especially the application of the stained vaginal smear as an aid in the diagnosis and interpretation of gynecological disorders other than cancer.

In the detection of anovulatory cycles I am frank to say that I cannot become at all enthusiastic about the value of the smears, since endometrial biopsy gives this information in a far simpler fashion, much more readily interpreted by most gynecologists, without the very special cytological experience essential to the interpretation of vaginal smears. After all, it is the endometrial reaction which best reflects the ovarian endocrine mechanism, and since it is so easily revealed by biopsy, I cannot see the advantage of resorting to the round-about and much more laborious method of vaginal smear study.

Nor do I feel that vaginal smear studies have as yet added much of practical value in the management of amenorrhea or as guides in the estrogen therapy of the menopause, any more than have the urine hormone titers from which so much was at one time expected. Certainly it has been amply shown that the cytological response of the vagina does not in any way parallel the clinical response of the menopausal woman to estrogen therapy. Disturbing vasomotor symptoms are often relieved long before any great degree of keratinization of the vaginal cells is achieved, just as they are often relieved long before there is any great drop in the gonadotrophic urinary hormones.

These comments are made in no captious spirit, but are meant simply to raise the question as to whether the practical value of vaginal smears, in the study of both cancer and the various functional disorders, has not been just a bit over accentuated, just as the value of urinary hormone studies in clinical work has proved to be much less than was originally hoped for. Laudable as all these studies undoubtedly are, and with full appreciation that their pursuance may yield much more in the future, it would, I believe, be wrong for a gynecologist to feel that he is depriving his patients of any vitally important diagnostic means simply because he has not made himself proficient in the study of vaginal smears.—Ed.)

## TUMORS OF THE FEMALE BREAST; A DIAGNOSTIC AND THERAPEUTIC SUMMARY

R. D. McCURE AND D. E. SZILAGYI

*Henry Ford Hospital, Detroit, Michigan*

J. Michigan M. Soc., 46: 559-562, 1947

The clinical characteristics of the commonest breast tumors are very briefly reviewed and the methods used at this hospital for the management of these lesions are outlined. It is stressed that every tumor of the female breast deserves and commands one's most earnest efforts for diagnosis, for the diagnosis of all of these tumors must be regarded as the differential diagnosis of carcinoma. Thus, all tumors of the breast must be excised for biopsy.

Phlegmonous and chronic pyogenic abscesses may cause a problem of differentiation from carcinoma. Biopsy will decide the diagnosis. The circumscribed, nonsuppurative forms of specific granulomas require biopsy for diagnosis. Simple mastectomy is generally the treatment. Besides the ordinary hematoma, the traumatic cyst and nodule are the only breast lesions which can rightfully be attributed to the effect of injury.

The discrete, usually single, freely movable and ovoid or spherical fibroadenoma is the commonest surgical lesion of the breast in the third and fourth decades. There seems to be a predisposition for sarcoma to develop in fibroadenomas, but it is questionable that carcinoma may arise from this neoplasm. Local surgical excision is the treatment.

The entities called adenofibrosis, chronic mastitis and cyclic hyperplasia may best be regarded as graded phases of the general picture of fibrocystic disease. For practical considerations, the forms with epithelial hyperplasia are most im-



portant because these may represent precancerous lesions. Unfortunately, clinical differentiation of one form from another is usually impossible. In all cases that show the characteristic diffuse changes without a localized mass or nodule, repeated observations at 3- or 6-month intervals are advised. When a palpable mass is found, its prompt removal for biopsy is urged. If the lesion is benign, no further surgery is done. If the microscopic picture discloses hyperplasia of precancerous potentiality, and particularly if the patient is over 50, a simple mastectomy is performed. If a benign nodule recurs, usually simple mastectomy is advised. In the latter case, however, the patient's age and attitude toward losing her breast are considerations which may influence one to prefer repeated excision to simple mastectomy. The authors do not believe that hormone therapy has a useful place in the management of chronic cystic mastitis.

The authors' discussion of cancer of the breast is limited to a summary of methods of treatment used in their hospital. They advise radical removal of all breast cancer that does not have distant metastases and that is not fixed to the chest wall. They have used exclusively the Halsted type of radical mastectomy in the treatment of breast cancer, and are convinced that none of the cardinal principles of this operation can be violated without penalty of a lessened chance of cure. Irradiation is recommended in all cases of breast cancer; the writers prefer to give the treatment postoperatively, starting the series as soon as the wound is healed.

In the past, inoperable breast cancer was treated with irradiation and possibly with a simple removal of an ulcerated mass if such were present. Recently, 2 lines of attack have been evolved: (1) the disruption of the production of estrogens by castration either with the knife or with x-ray irradiation; and (2) the neutralizing of these hormones by the administration of testosterone or allied substances. The authors have used testosterone propionate in conjunction with irradiation in a few cases and noted satisfactory response but only temporarily.

The writers consider Paget's disease as a true malignant neoplasm and treat it as such. Sarcomas of the breast are rare tumors, and are best managed in the same manner as carcinomas.

(Many gynecologists include the mammary gland within their bailiwick, and there can be no rational objection to this, nor can such a concept be considered invasive of the general surgeon's field. It has, I believe, been officially sanctioned by the American Board of Obstetrics and Gynecology. However, the gynecologist who treats lesions of the breasts should know a good deal about them, and in many excellent gynecological clinics he has very little opportunity for training in this field. If he does not acquire such training, he is not qualified to treat mammary lesions, and he should not do so. In other words, he must let his conscience be his guide. Furthermore, his conscience on this point should be rather sensitive, for mistakes in the diagnosis and treatment of mammary tumors may have tragic consequences to the patient. The article abstracted above is a very sound short resumé of the common lesions of the female breast. And it is authoritative, as the senior author received his own training in this field from Dr. Halsted himself.—Ed.)

THE ROLE OF STERILIZATION IN THE TREATMENT  
OF BREAST CANCER

J. F. SHERRILL, JR.

J. Bowman Gray School Med., 4: 120-126, 1946

Experimental evidence indicates that hereditary factors are of great importance in determining the influence of estrogens in cancer of the breast in mice and rats. Geschickter demonstrated with animals that the estrogens promote the growth both of the epithelium and fibrous structures of the breast. Continued over-dosage effects a state of hyperfunction and hypersecretion, accompanied by metaplastic changes. Continued over-dosage further results in involution, degeneration and atrophy, and finally, a series of atypical proliferations of epithelial and fibrous tissues occurs which is followed by benign or malignant tumors. Halberstadter found that early castration of female mice reduced the incidence of cancer in strains which show a high percentage of spontaneous mammary cancer. Mammary cancer may be produced in male mice by the implantation of ovaries following previous castration.

Although there is no significant deviation from normal in excretion rates of the sex hormones in women with breast cancer, it is possible and likely that in some instances estrogens are indirectly responsible inasmuch as they may produce precancerous changes or may provide a suitable substrate so that another agent may act. A few reports cite cases where breast cancer has appeared during prolonged and intensive estrogen therapy. Olch concluded that almost 5 times as many women with breast cancer had a delayed menopause as compared with normal women. Herrell, in reviewing records of patients with and without breast cancer, found that in the cancer group the incidence of castration before cancer was diagnosed was 1.5 per cent. The incidence in the non-cancer group was 15.4 per cent.

It has been concluded by those with the most experience that castration may be expected to offer temporary improvement in about  $\frac{1}{3}$  of the patients with recurrent or inoperable cancer. Benefits obtained are more striking in the premenopausal group. The greatest changes are noted in those patients with bone metastases.

It seems, in those cases which show a favorable response to menopause, that the tumor growth is unusually dependent on the presence of considerable amounts of estrogen, and that the removal of this growth stimulus temporarily results in the retardation of growth or in actual regression. No one histological type of cancer seems to be peculiarly sensitive. The benefit from castration is temporary, and after a period of latency, usually 6 to 24 months, the growth of cancer continues. Radiation castration has proved as effective as surgical castration.

Castration cannot be recommended as routine treatment, and by no means should the value of radical mastectomy in the treatment of breast cancer be

underestimated. Each case should be studied carefully and thoroughly before sterilization is advised. At the Pondville Hospital, the following procedure is followed in determining the patients to receive sterilization for breast cancer:

A careful local examination is made to determine the operability of the case. Soft tissue films of the breast and routine films of the chest, skull, lumbosacral spine and pelvis are made. If metastases are found, a radical mastectomy is contraindicated, and the case should be treated by radiation alone. If no metastases are revealed by roentgen examination and the growth is not of inflammatory type, the breast is surgically removed. About 10 days postoperatively, high voltage roentgen therapy is given to the operative site, including the axillary and supraclavicular regions. Treatment over the ovaries is then carried out to produce sterilization.

(The author summarizes very well the rationale for sterilization as a part of the treatment of breast cancer, more particularly in women during the menstruating age. Some surgeons appear to be rather decided in their preference for surgical castration in preference to radiotherapeutic abolition of ovarian function, as practiced in the author's clinic, but I have never been able to see the logic for this viewpoint. In any event, an increasing number of surgical clinics appear to have adopted the general concept.

In view of the good results of stilbestrol therapy in palliating and retarding the course of advanced prostatic carcinoma, especially when bony metastasis has occurred, it is not strange that the male hormone has in the past 2 or 3 years been used in a number of good clinics for similar palliation in cases of female mammary carcinoma. The reports are as yet few in number, but they appear to indicate that genuine palliation does occur, although there is of course no curative effect.—Ed.)

## BOOK REVIEW

### ENDOCRINOLOGIA SEXUAL FEMENINA

BY CARLOS J. CALATRONI, VICENTE RUIZ AND GUILLERMO DI PAOLA

1 volume, 724 pages

Published by "El Ateneo", Buenos Aires, Argentina

In this book, the interesting subject "Female Sexual Endocrinology", has been thoroughly dealt with by the authors. The work is well planned and gives the reader a general knowledge of female sexual physiopathology.

It is divided into three parts; the evolution of woman from fertilization to old age, the sexual endocrine system and the female sex hormones.

The first part contains, in separate chapters, an analysis of intrauterine life, infancy, adolescence, sexual maturity and the climacteric. In the chapter on "sexual maturity", the normal sexual cycle and its abnormalities are described. The authors carefully point out the role of the endocrine glands in the psychosomatic balance.

The second part is devoted to the sexual endocrine system and treats with the physiopathology of the hypophysis, ovaries, adrenals and thyroid glands and their influence on sexual mechanism.

In the third part are treated in detail the female sex hormones (gonadotrophins, prolactin, estrogens and progesterone) and the indications for their use in therapy. The subject of treatment is presented very lucidly and instructively, and this is of considerable help to the practitioner.

The book has a prologue by Prof. Bernardo A. Houssay. It contains numerous black and white illustrations, colored plates and over 3000 references.

GUILLERMO TERZANO



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